# Headquarters U.S. Air Force

*Integrity - Service - Excellence*

# FORMER WILLIAMS AIR FORCE BASE

# BCT MEETING

25 March 2015

# Headquarters U.S. Air Force

*Integrity - Service - Excellence*

## SITE ST012,
## FORMER LIQUID FUELS STORAGE AREA

## REMEDIAL ACTION

# ST012 UPDATE

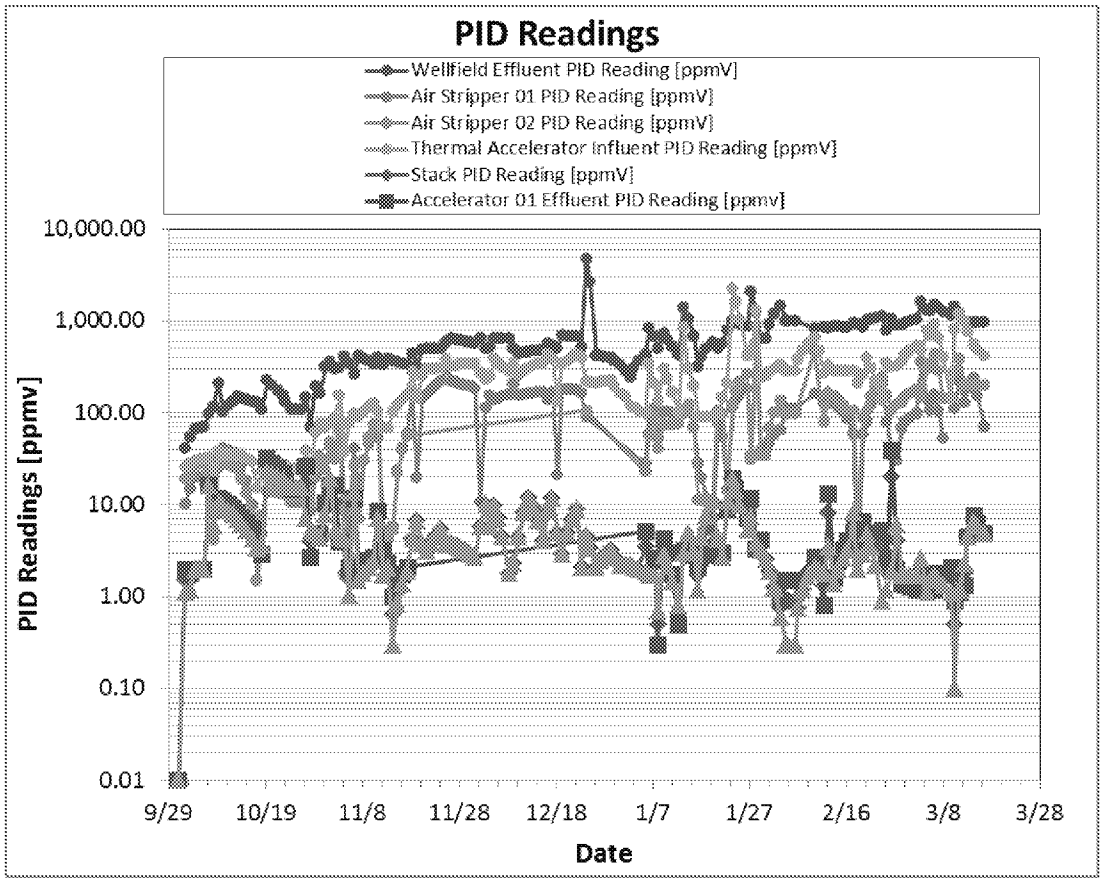
- SEE Operations Progress
- Near-term SEE Operational Plan
- SVE System Update

# *SEE System Updates*

# ST012 SEE SYSTEM STATUS - SUMMARY

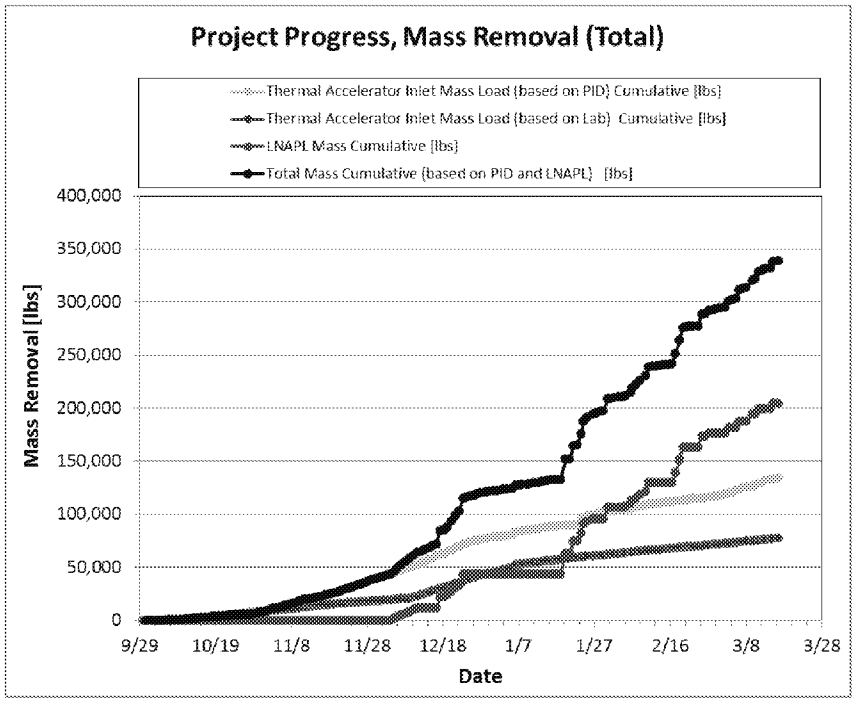
| Summary | | |
|---|---|---|
| | **Value** | **Unit** |
| Target Treatment Zone (TTZ) Soil Volume | 410,000 | cubic yards (cy) |
| Area | 199,000 | square feet ($ft^2$) |
| Upper Depth of Treatment | 145 | feet (ft) below ground surface (bgs) |
| Lower Depth of Treatment | 245 | ft bgs |
| Vapor Liquid Treatment Started | 09/29/14 | |
| Thermal Operations Started | 09/29/14 | |
| Last Process Data Update | 03/16/15 | |
| Last Temperature Data Update | 03/16/15 | |
| Estimated Total Days of Operation | 422 | days |
| Days of Operation | 169 | days |
| Days of Operation vs. Estimate | 40 | percent (%) |
| Estimated Total Energy Usage | 11,343,000 | kilowatt hours (kWh) |
| Total Energy Used | 1,375,863 | kWh |
| Used Electrical Energy vs. Estimate | 12 | % |
| Total Steam Injected | 86.6 | million pounds (lbs) |
| Projected Total Steam Injection | 320 | million lbs |
| Steam Injected Vs Projected | 27 | % |
| Mass Removed in Vapor Based on Photoionization Detector (PID) Readings | 134,144 | lbs |
| Mass Removed as NAPL | 204,721 | lbs |
| Total Vapor and Liquid Mass Removal (based on PID readings) | 338,865 | lbs |
| Average Power Usage Rate Last Week | 380 | kilowatts (kW) |
| Average Wellfield Vapor Extraction Rate Last Week | 297 | standard cubic feet per minute (scfm) |
| Average Condensate Production Rate Last Week | 0.1 | gallons per minute (gpm) |
| Average Water Extraction Rate Last Week | 115 | gpm |
| Total Water Extracted | 23,606,947 | gallons |
| Recovered Light Non-Aqueous Phase Liquid | 27,370 | gallons |
| Average Water Discharge Rate Last Week | 137 | gpm |
| Total Treated Water Discharge | 29,262,000 | gallons |

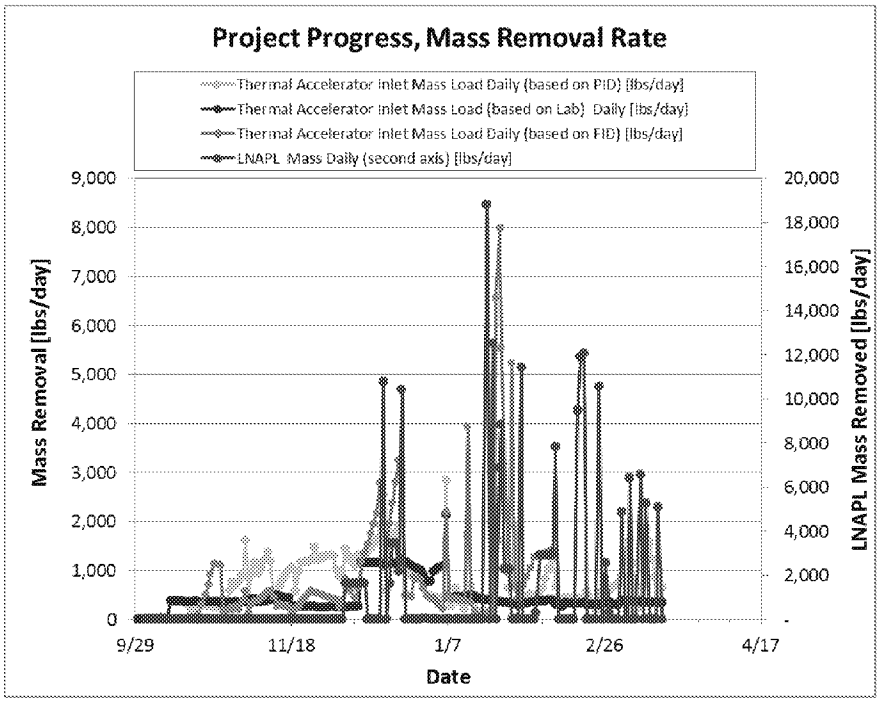
# ST012 SEE SYSTEM PID READINGS




- Vapors continue to be rich in organics

# ST012 SEE SYSTEM MASS REMOVAL




- NAPL recovery continues
- An estimated 205,000 lbs (~31,000 gallons) of mass has been removed as NAPL
- An estimated 135,000 lbs of mass (PID) has been removed in the vapor phase

# ST012 Steam Injection Status

# ST012 SEE OPERATIONAL PROGRESS

- **SEE Startup** — 29 Sep
- **Extraction Only Phase** — 29 Sep – 15 Oct
  - All CZ, UWBZ, and LSZ MPE wells turned on
  - Extraction System Optimization/Troubleshooting
  - Perimeter Monitoring to Demonstrate Hydraulic Control
- **Steam Injection Step 1** — 16 Oct – 3 Nov
  - 9 Exterior LSZ wells
  - Perimeter and Temperature Monitoring for Effects
- **Steam Injection Step 2** — 3 Nov – 4 Dec
  - Same 9 Exterior LSZ wells from Step 1
  - Add 6 Interior LSZ wells
  - Perimeter and Temperature Monitoring for Effects
- **Steam Injection Step 3 – revised** — 4 Dec – 22 Dec
  - Same 15 LSZ wells from Step 2
  - Add 7 Exterior UWBZ wells
  - Perimeter and Temperature Monitoring for Effects

# ST012 SEE OPERATIONAL PROGRESS - CONTINUED

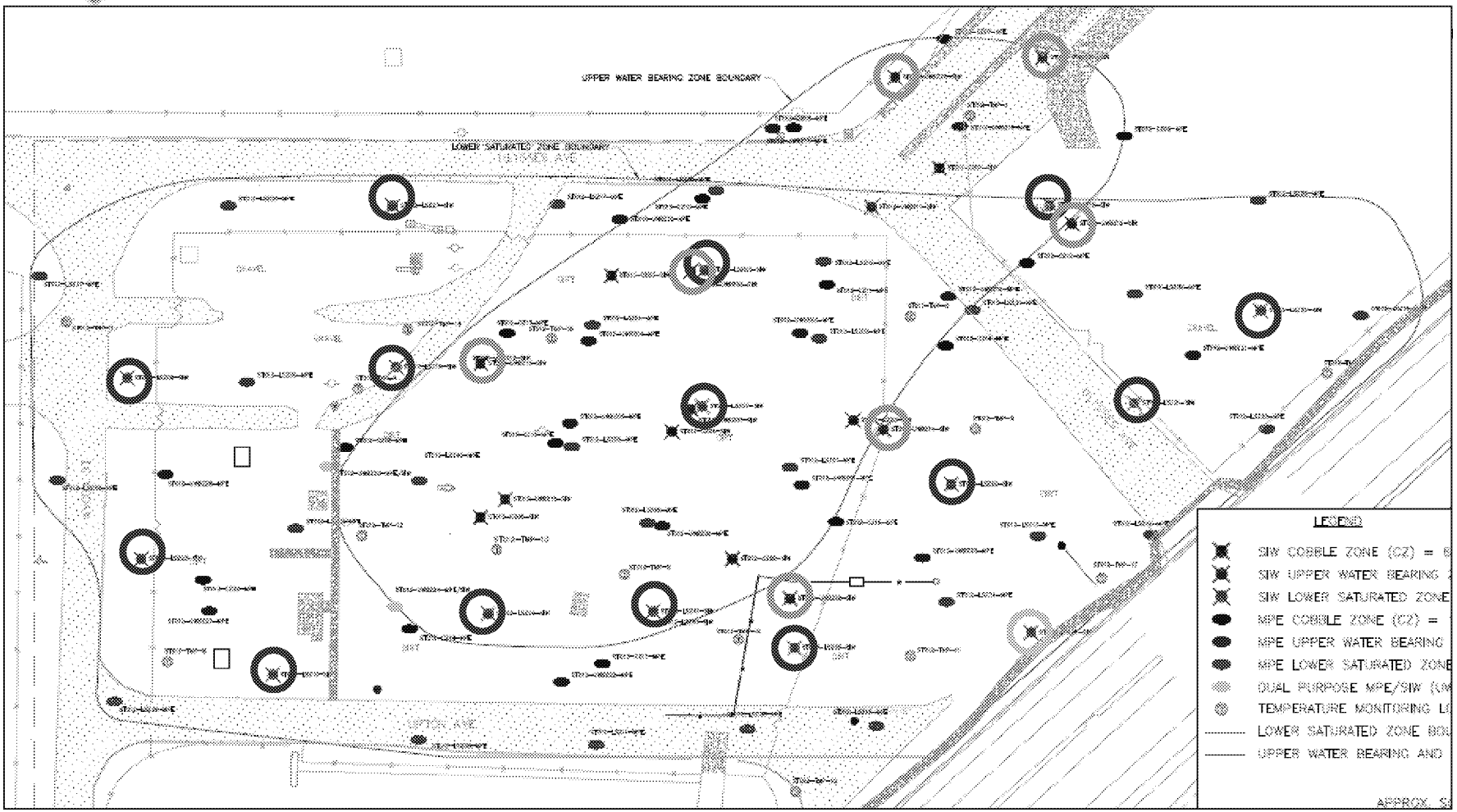
- **Liquid Treatment System Cleanouts/ Changeouts** — **23 Dec – 5 Jan**
  - Accumulated biomass cleaned out of process tanks
  - Liquid carbon vessel changeout

- **SEE System Operations** — **6 Jan – 23 Feb**
  - Average liquid extraction rate of 86 gpm
  - From 6 January 6 through 19 January typically three eductor skids were online at a time
  - From 20 January to present, typically four eductor skids were online at a time – beginning 18 February, eductor skid 6 (primarily servicing the down gradient edge of the treatment zone) has been operated continuously
  - Average steam injection rates of 18,700 lbs per hour in the LSZ and 4,900 lbs per hour in the UWBZ
  - Twenty-one steam wells are currently online (see next slide) – injection rates at wells have varied due to boiler issues and in preparation for MPE transition piece preventative replacement
  - On 16 February injection well LSZ26 was shut down in preparation for the MPE transition piece preventative replacement in nearby wells (*this well was slowly ramped back up last week)*

# ST012 SEE OPERATIONAL PROGRESS - CONTINUED

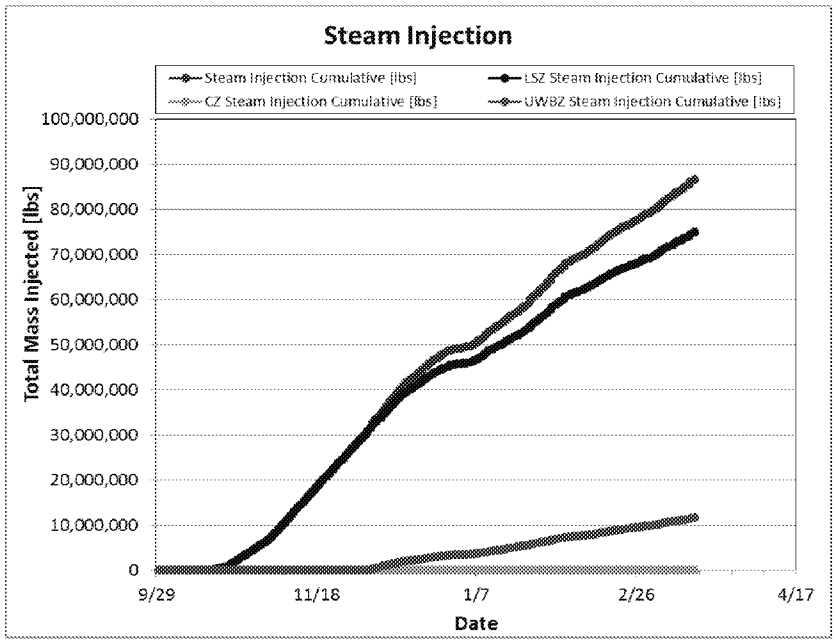
- **SEE System Operations** — **24 Feb – 16 March**
  - Average liquid extraction rate of 86 gpm
  - Typically four eductor skids were online at a time – eductor skid 6 (primarily servicing the down gradient edge of the treatment zone) has been operated continuously
  - Average steam injection rates of 15,600 lbs per hour in the LSZ and 4,900 lbs per hour in the UWBZ
  - Twenty-one steam wells are currently online (see next slide) – injection rates at wells have varied due to boiler issues and due to MPE transition piece preventative replacement

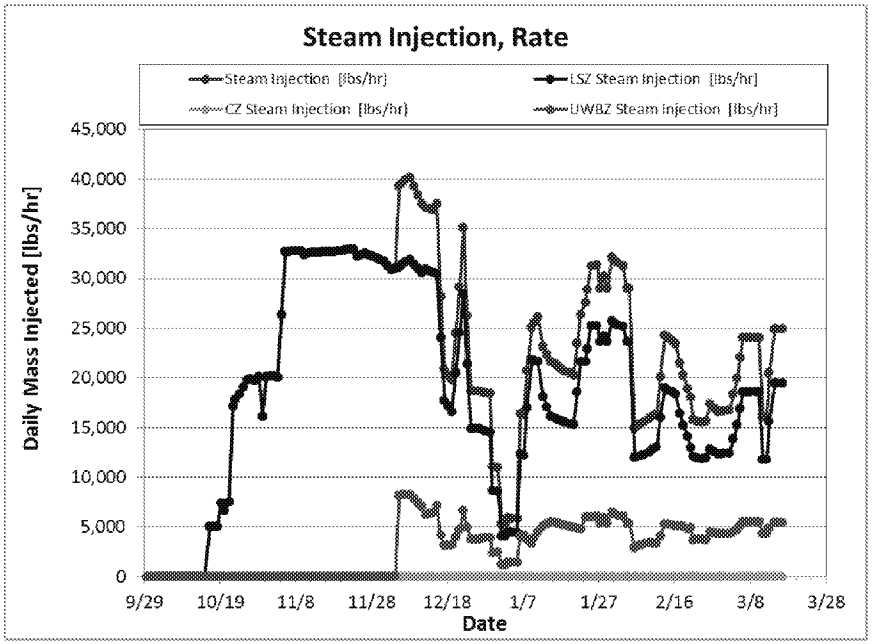
# ST012 STEAM INJECTION – MODIFIED STEP 3 PERIMETER UWBZ




- LSZ wells online (14)
- UWBZ wells online (7)
- LSZ well currently offline (1)

# ST012 SEE STEAM INJECTION




- **Current average steam injection:**
  UWBZ 5,500 lbs/hr ~ 11 gpm as water,
  LSZ 19,500 lbs/hr ~ 39 gpm as water total

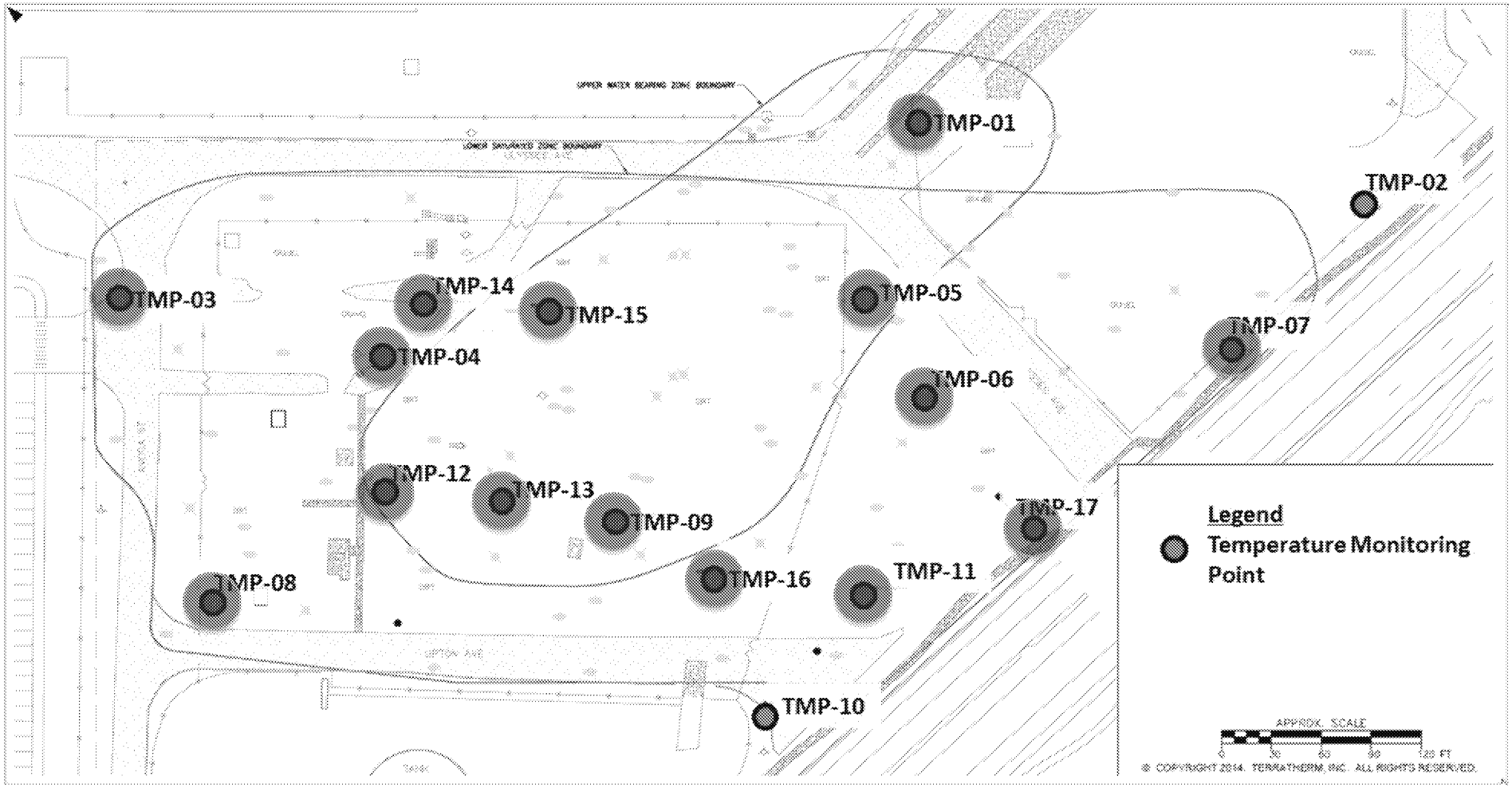
- **Total steam injection rate equivalent to 50 gpm of water**

# ST012 SEE DISCHARGE COMPLIANCE

- We continue to collect weekly samples of carbon influent, midfluent, and effluent to monitor for breakthrough. In addition, midfluent is sampled twice per week for pesticides.
- Coordination has continued with the City of Mesa throughout January and February 2015 and the City has not identified any additional actions or concerns. Discharge non-compliance reporting from 22 December sampling is complete.
- We continue to operate both air strippers, manage biomass layers in the T102 tank that feeds the air strippers and GAC, and monitor closely for breakthrough at the GAC midfluent.

# ST012 Steam Injection Influence at Temperature Monitoring Points

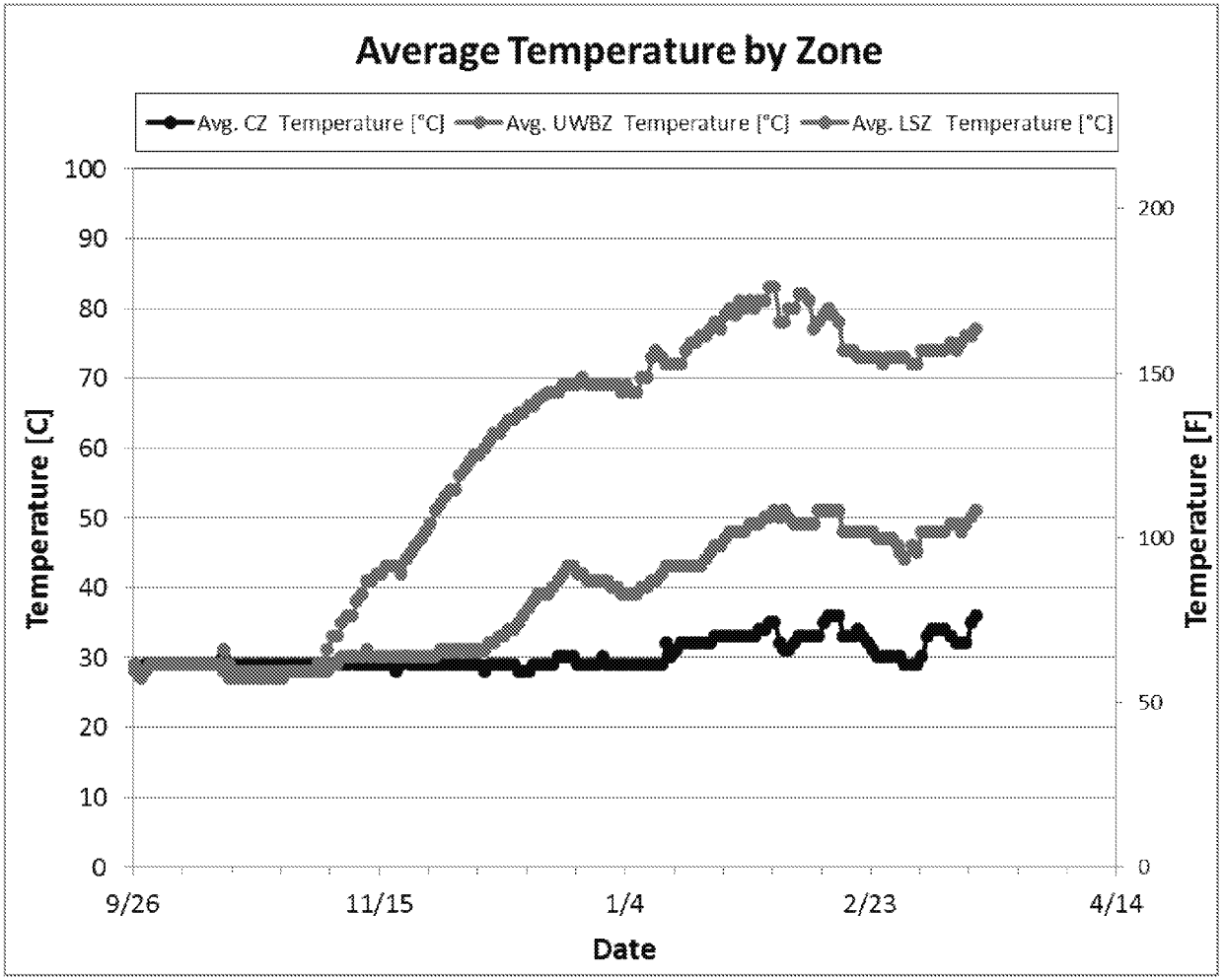
# ST012 TEMPERATURE MONITORING POINTS

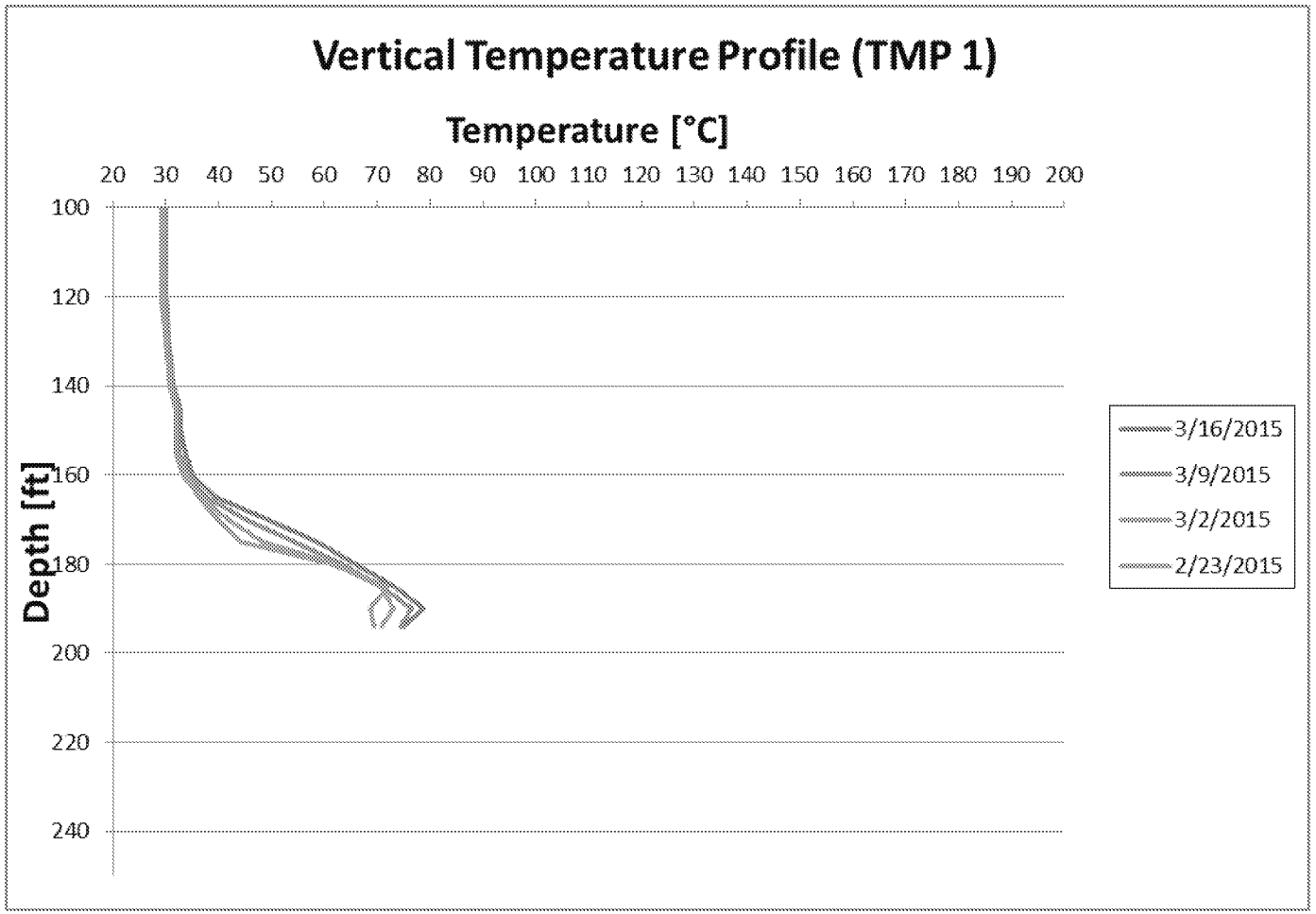


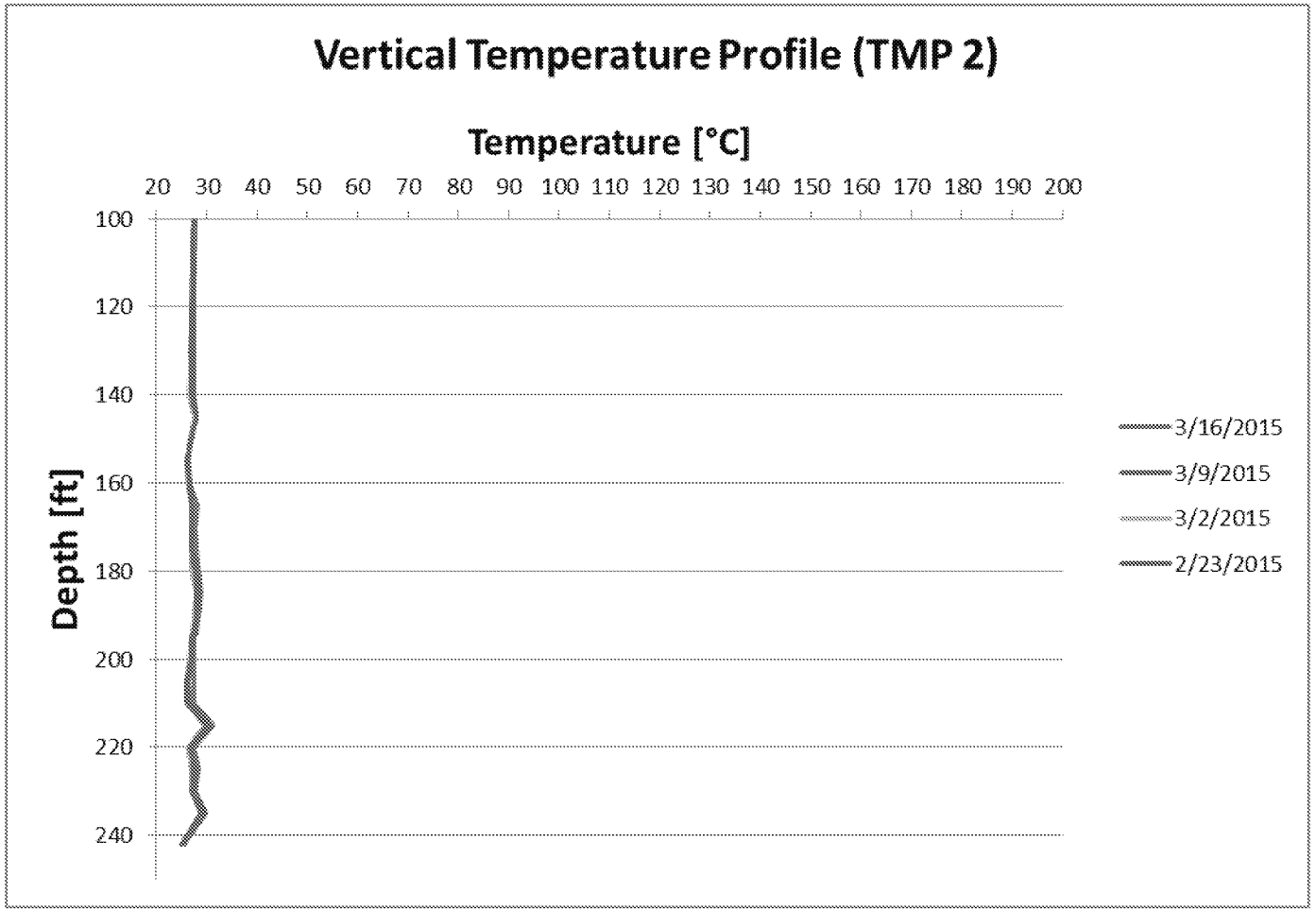

- Highlighted TMPs show heat up

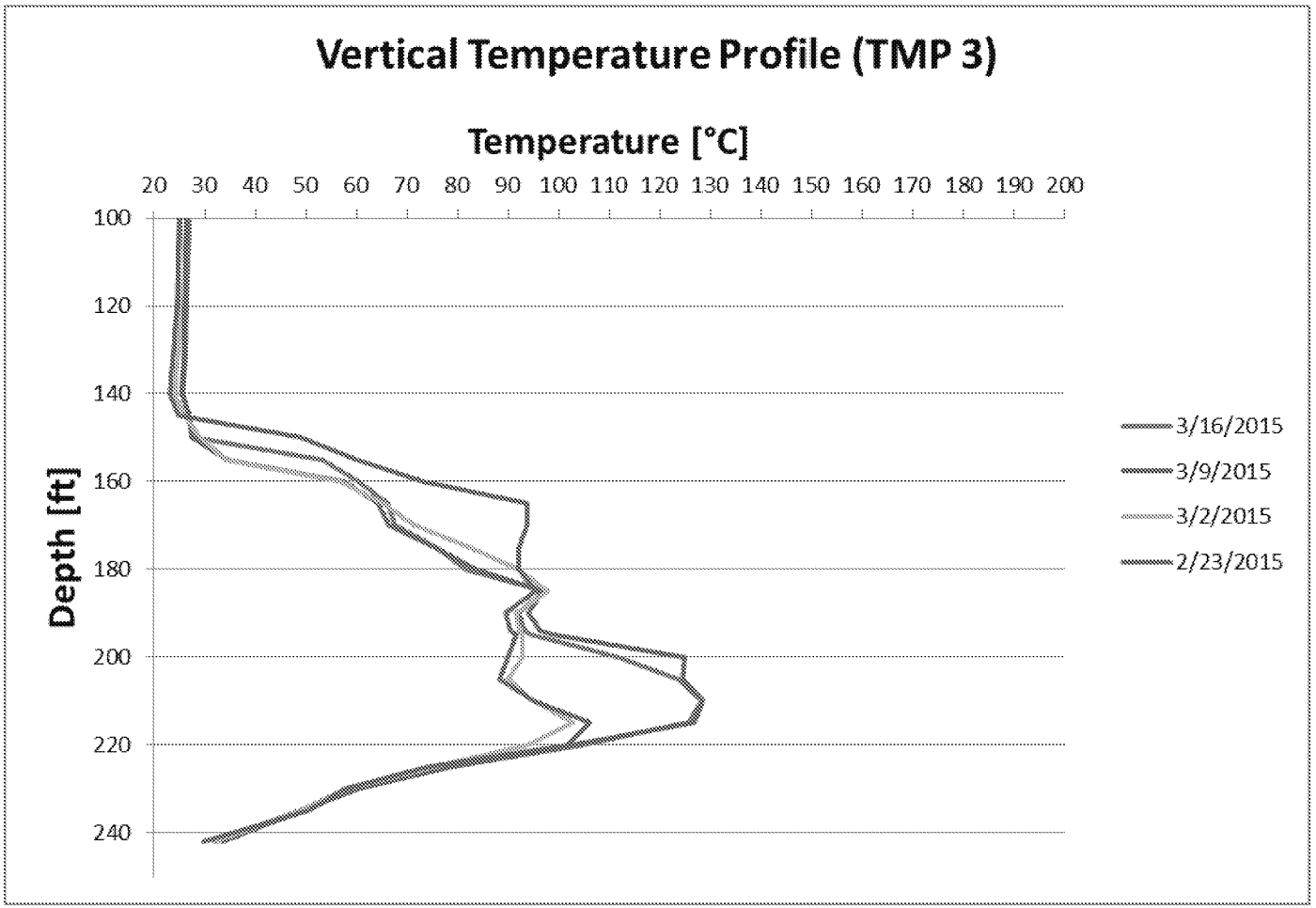
*Integrity - Service - Excellence*

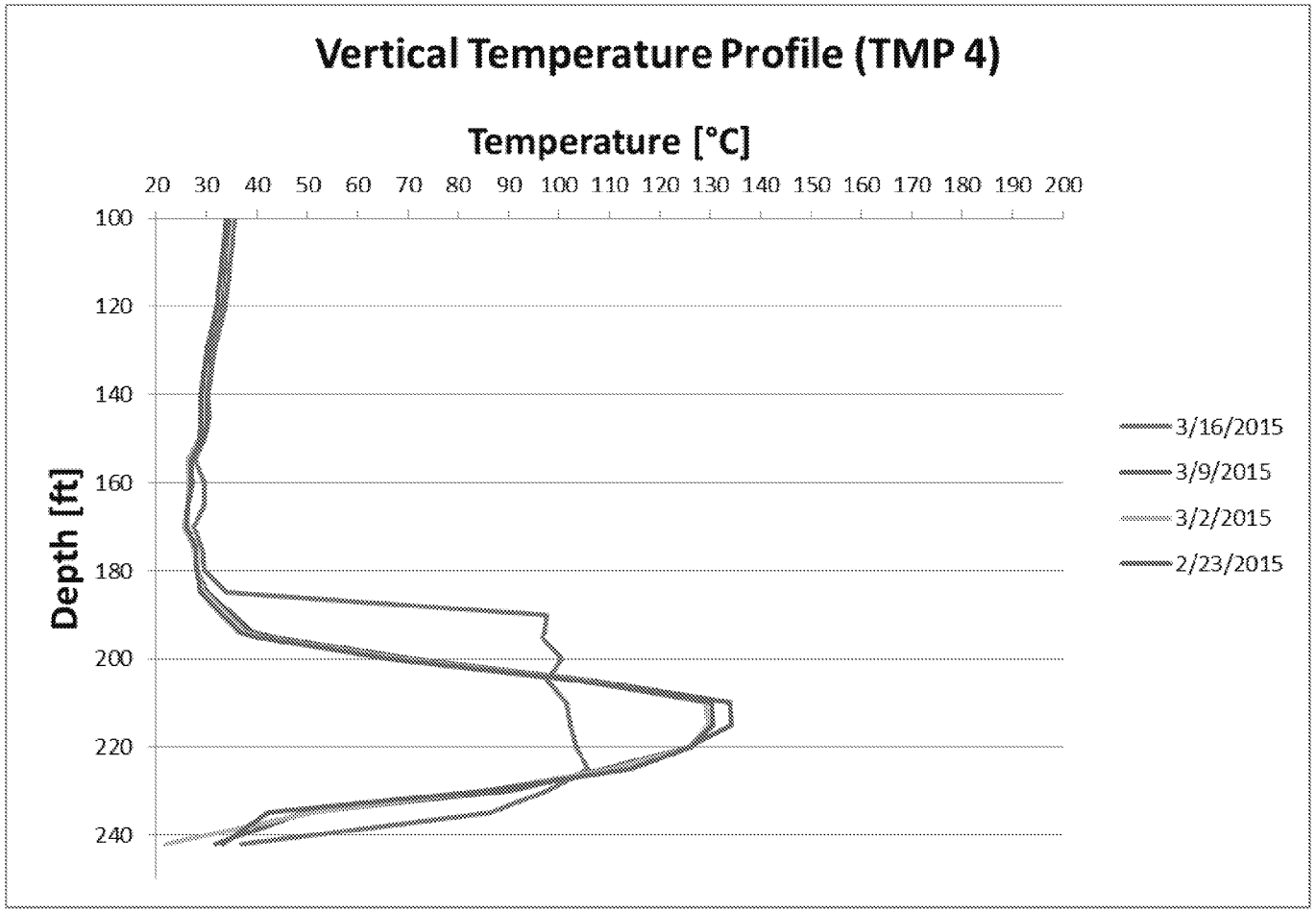
# ST012 SEE CO-LOCATED TEMPERATURES AT EXTRACTION WELLS BY ZONE



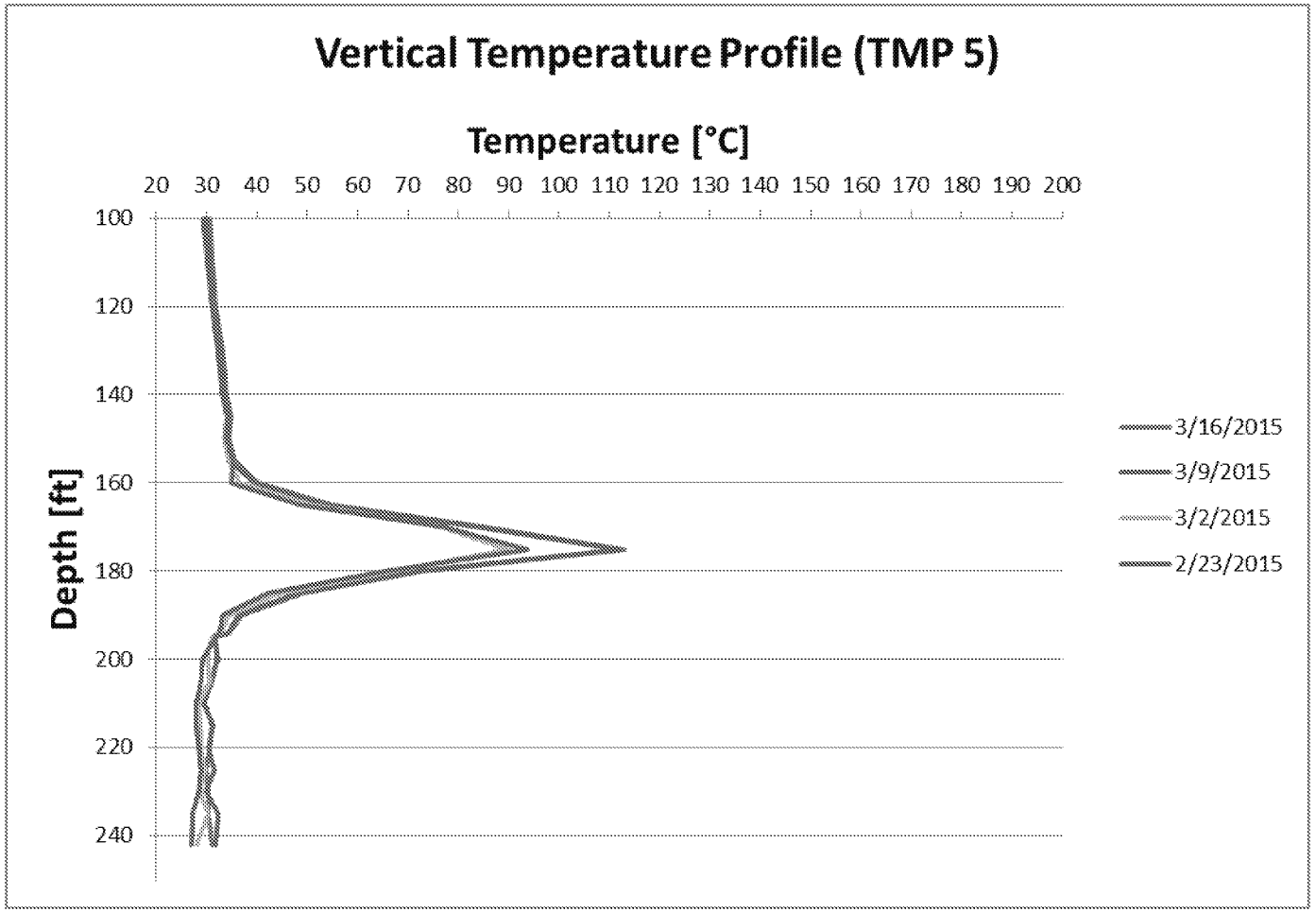

Vertical Temperature Profile (TMP 1)
Temperature [°C]
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Depth [ft]
100 120 140 160 180 200 220 240
3/16/2015
3/9/2015
3/2/2015
2/23/2015

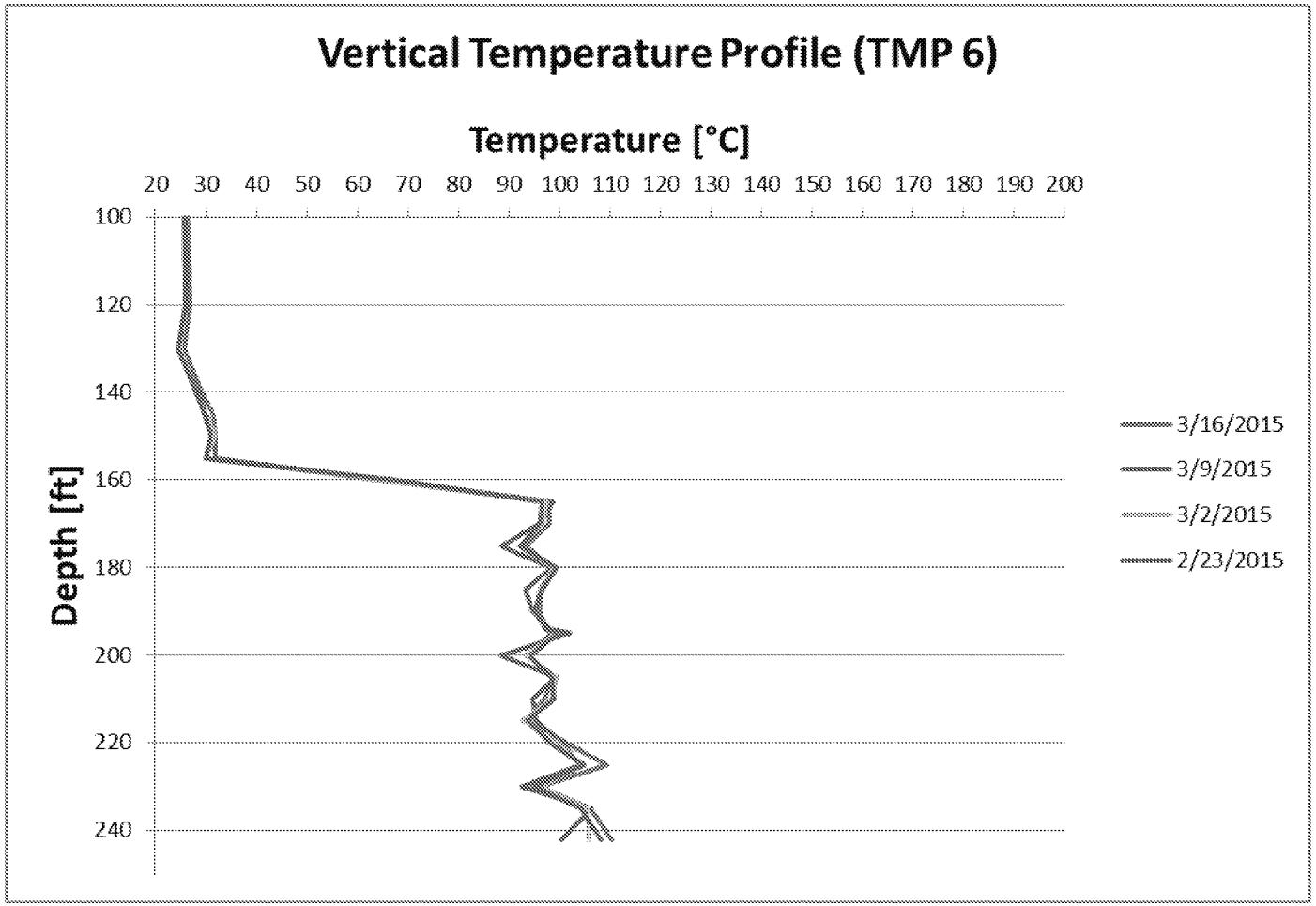

Vertical Temperature Profile (TMP 2)
Temperature [°C]
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Depth [ft]
100 120 140 160 180 200 220 240
3/16/2015
3/9/2015
3/2/2015
2/23/2015

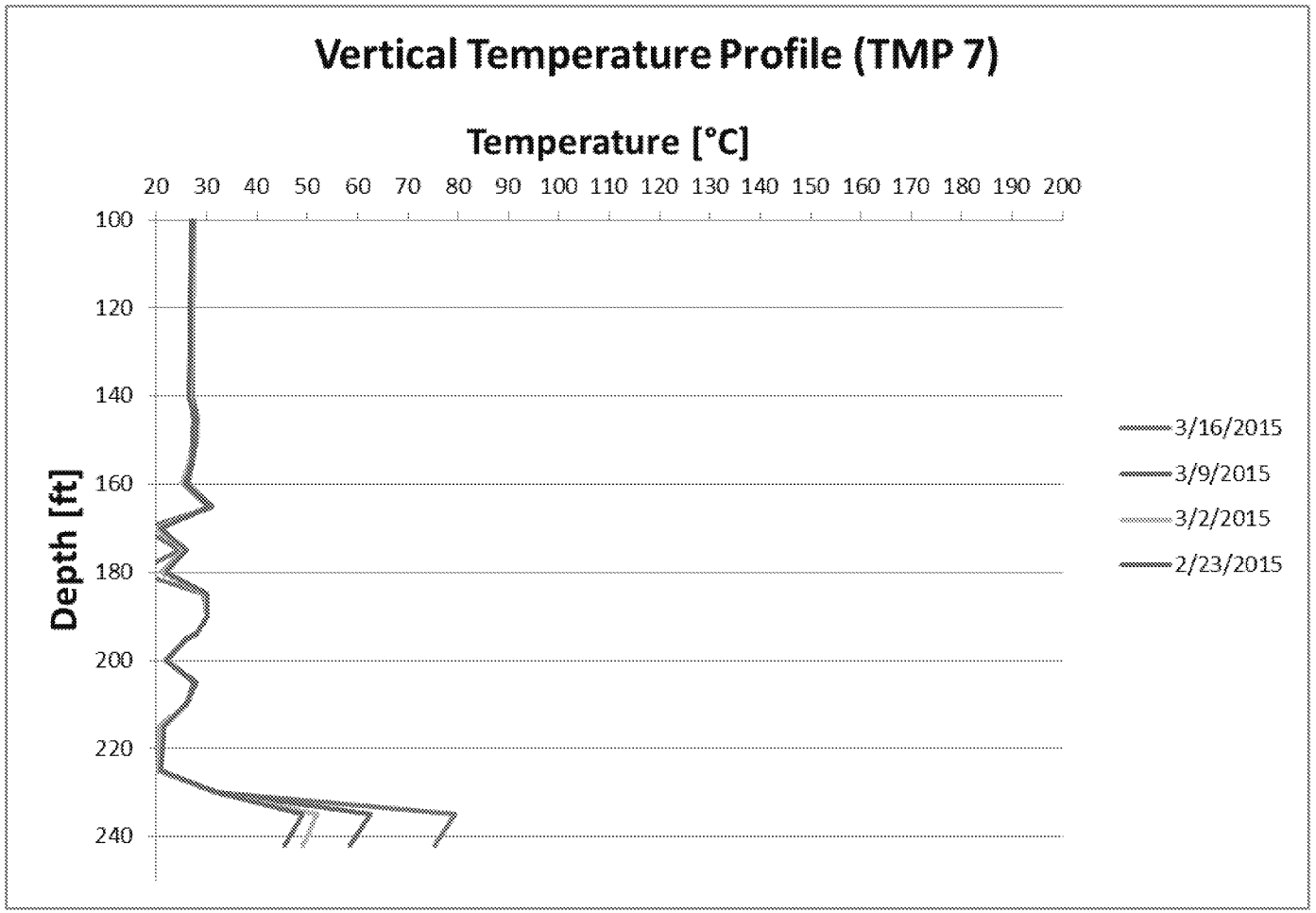

Vertical Temperature Profile (TMP 3)
Temperature [°C]
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Depth [ft]
100
120
140
160
180
200
220
240
3/16/2015
3/9/2015
3/2/2015
2/23/2015

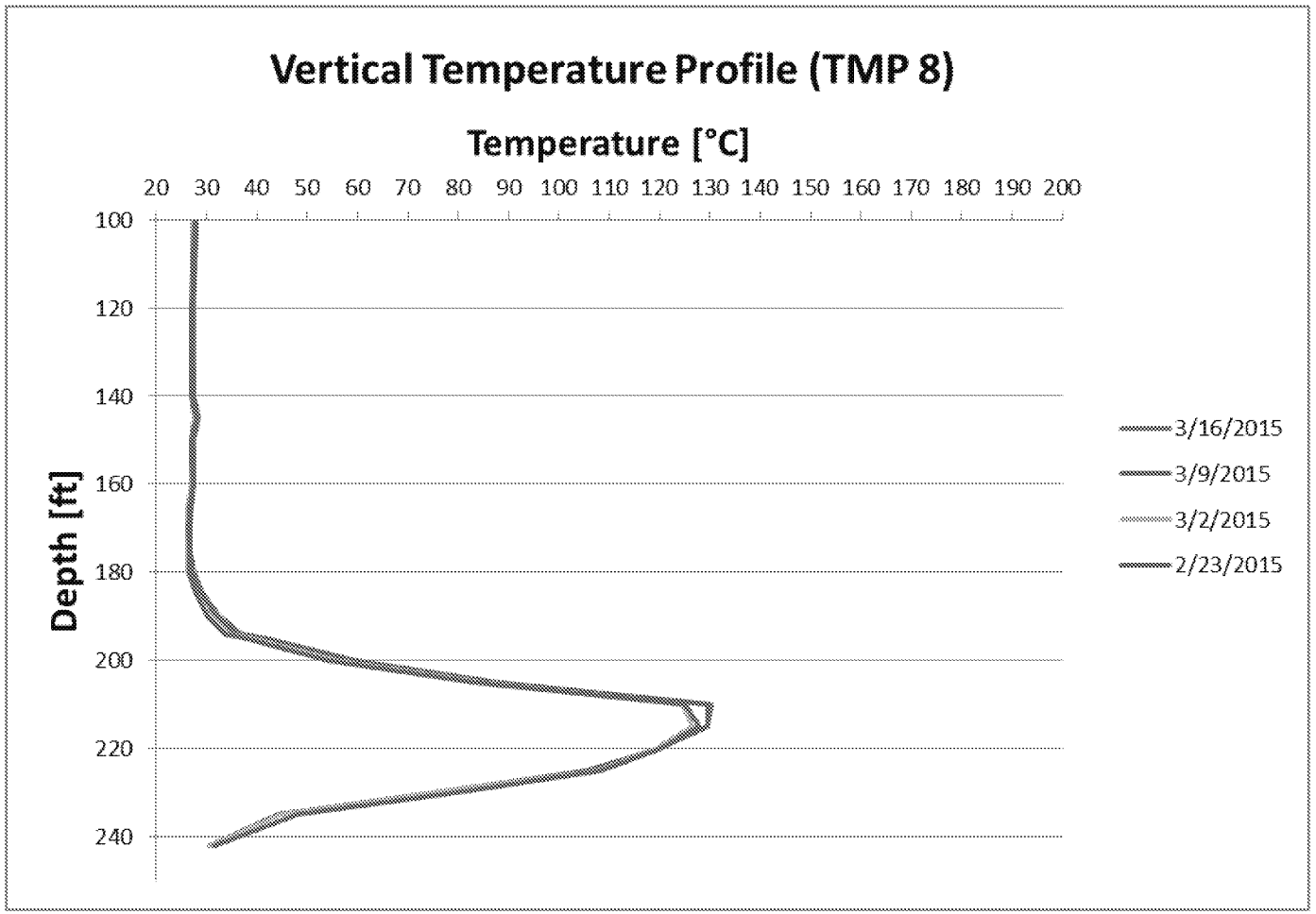


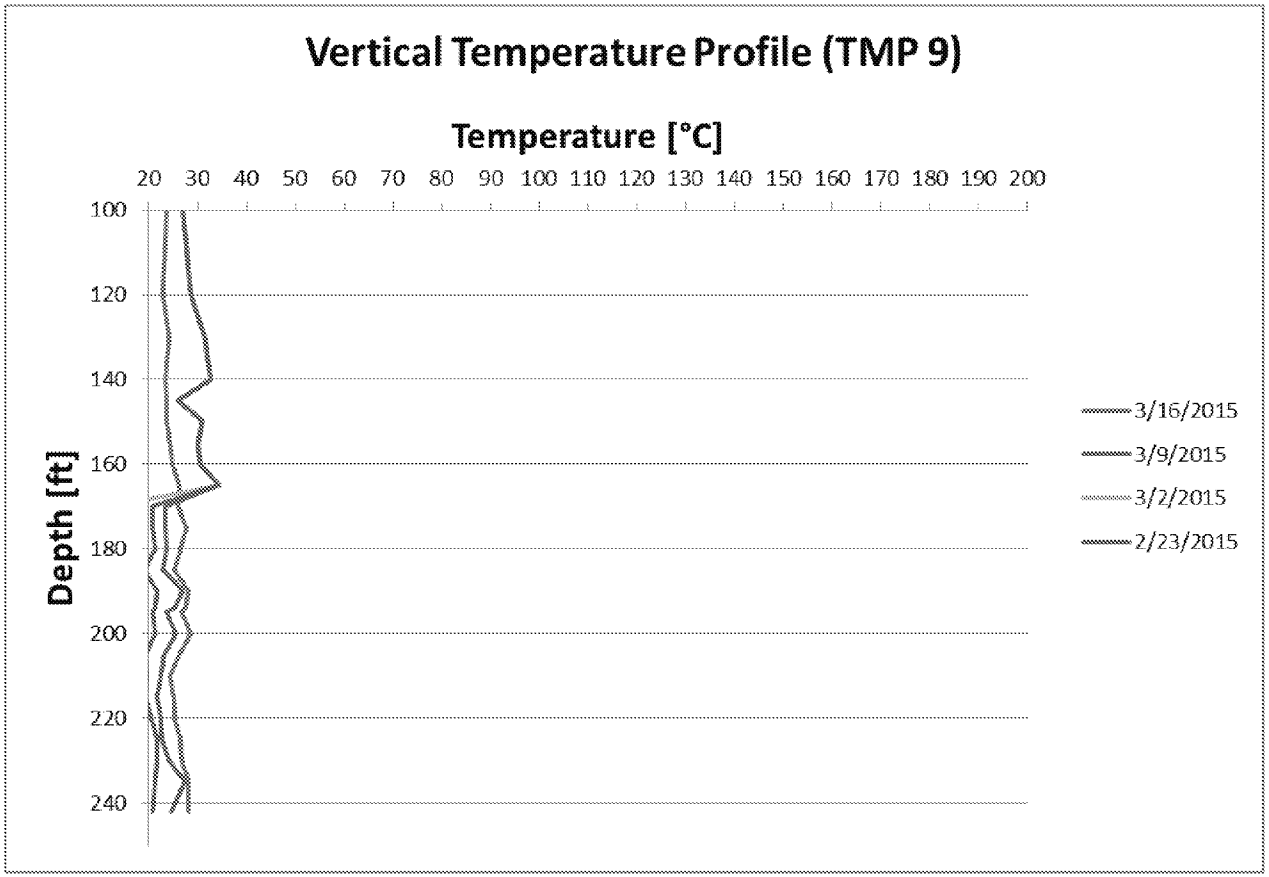

- Recent temperature data collected show that the well casing at TMP4 is potentially compromised. The monitoring point will be further troubleshot.


Vertical Temperature Profile (TMP 5)
Temperature [°C]
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Depth [ft]
100
120
140
160
180
200
220
240
3/16/2015
3/9/2015
3/2/2015
2/23/2015

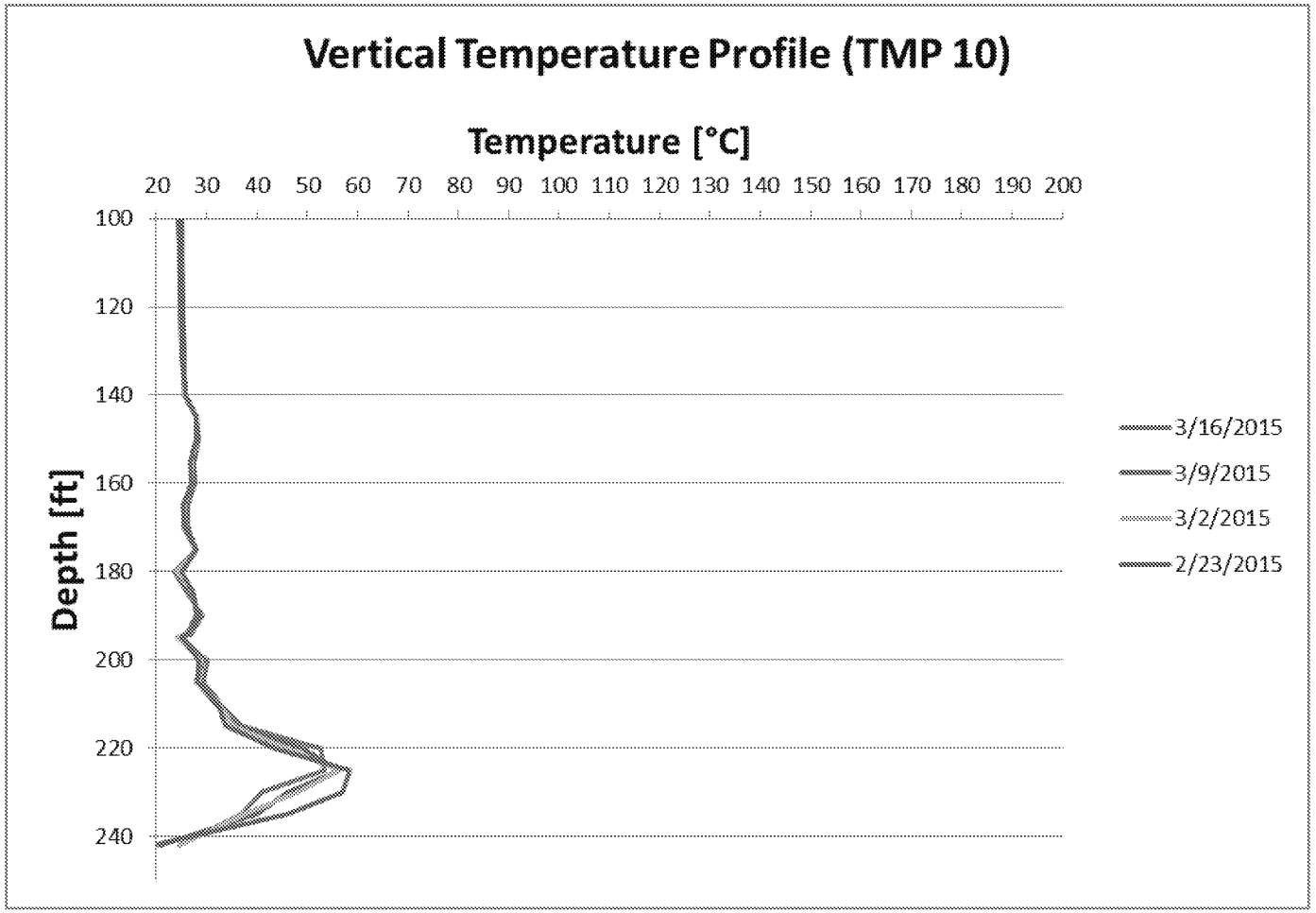

Vertical Temperature Profile (TMP 6)
Temperature [°C]
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Depth [ft]
100 120 140 160 180 200 220 240
3/16/2015
3/9/2015
3/2/2015
2/23/2015

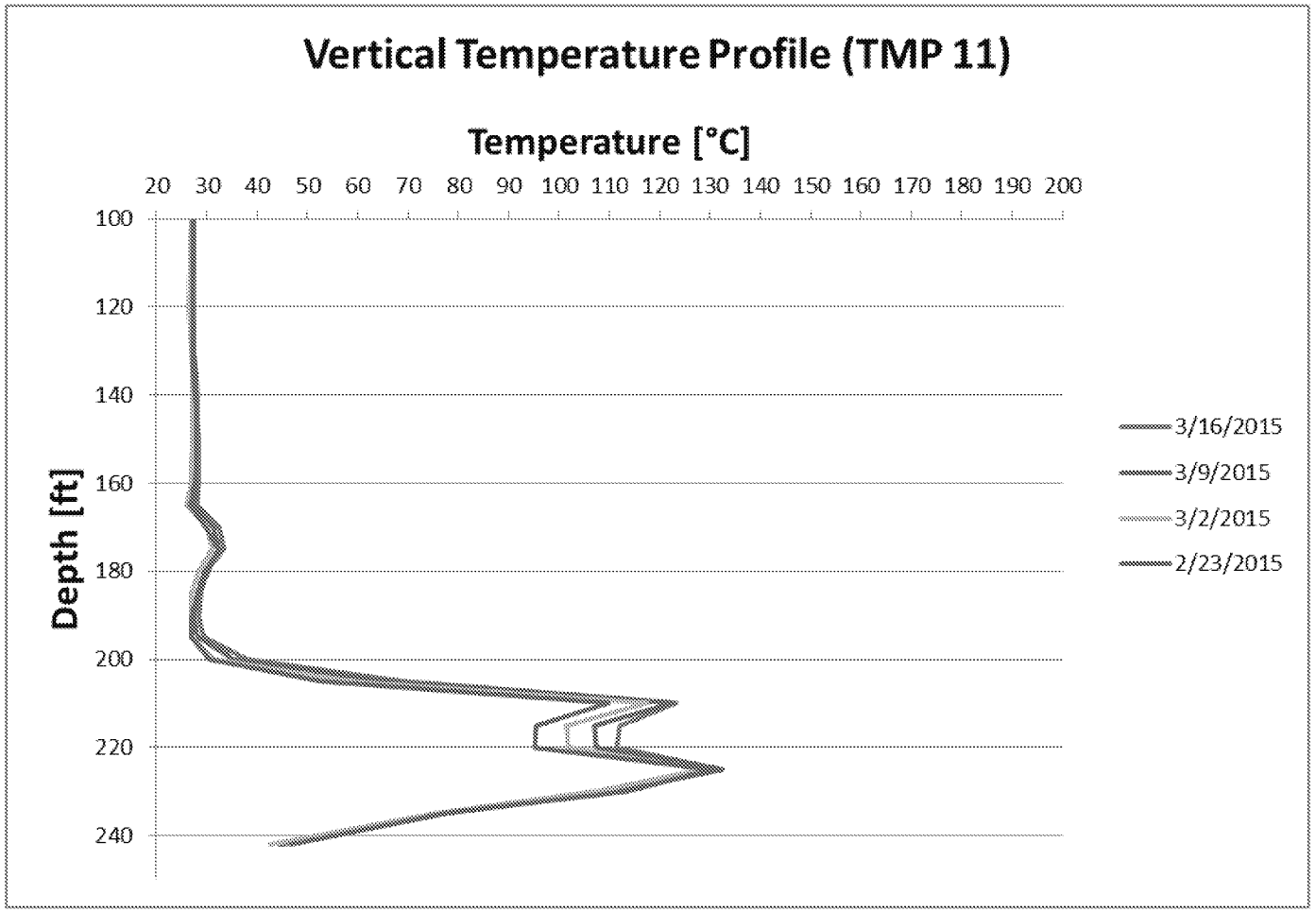

Vertical Temperature Profile (TMP 7)
Temperature [°C]
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Depth [ft]
100
120
140
160
180
200
220
240
3/16/2015
3/9/2015
3/2/2015
2/23/2015

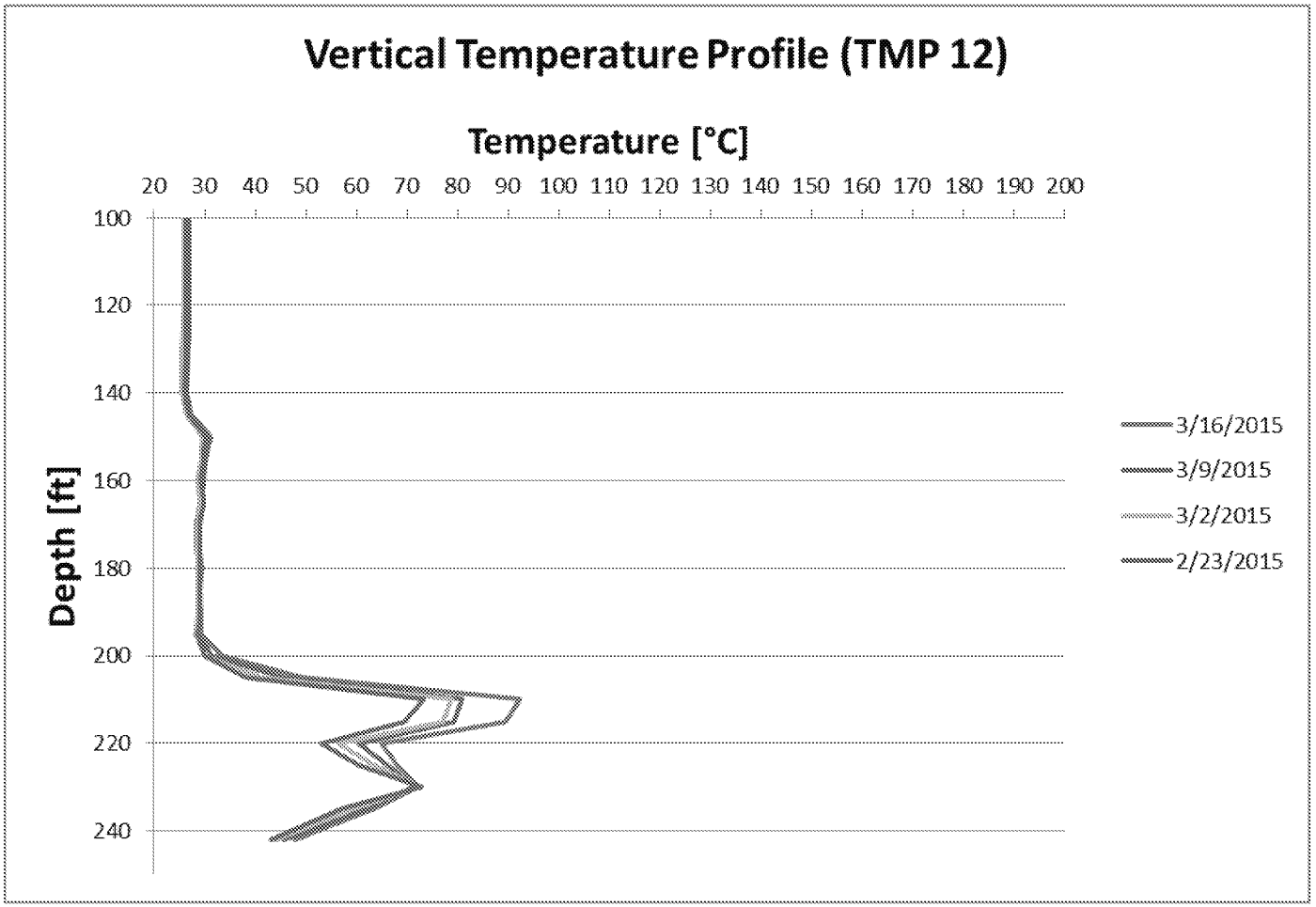

Vertical Temperature Profile (TMP 8)
Temperature [°C]
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Depth [ft]
100 120 140 160 180 200 220 240
3/16/2015
3/9/2015
3/2/2015
2/23/2015

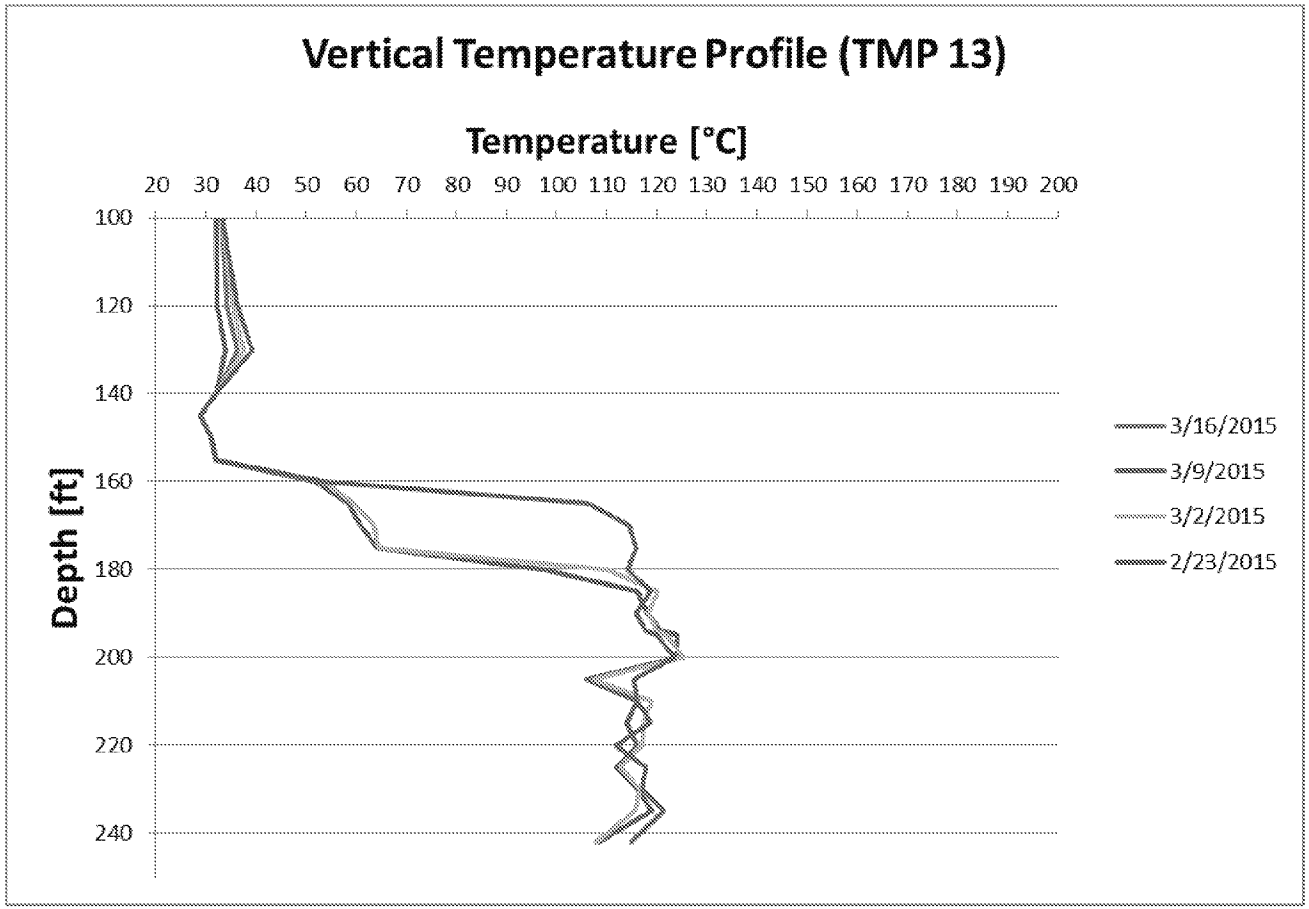



- The well casing at TMP9 has been confirmed as compromised and the temperature array has been removed from the well to prevent damage. The temperature array will be grouted in place to prevent vertical temperature smearing.

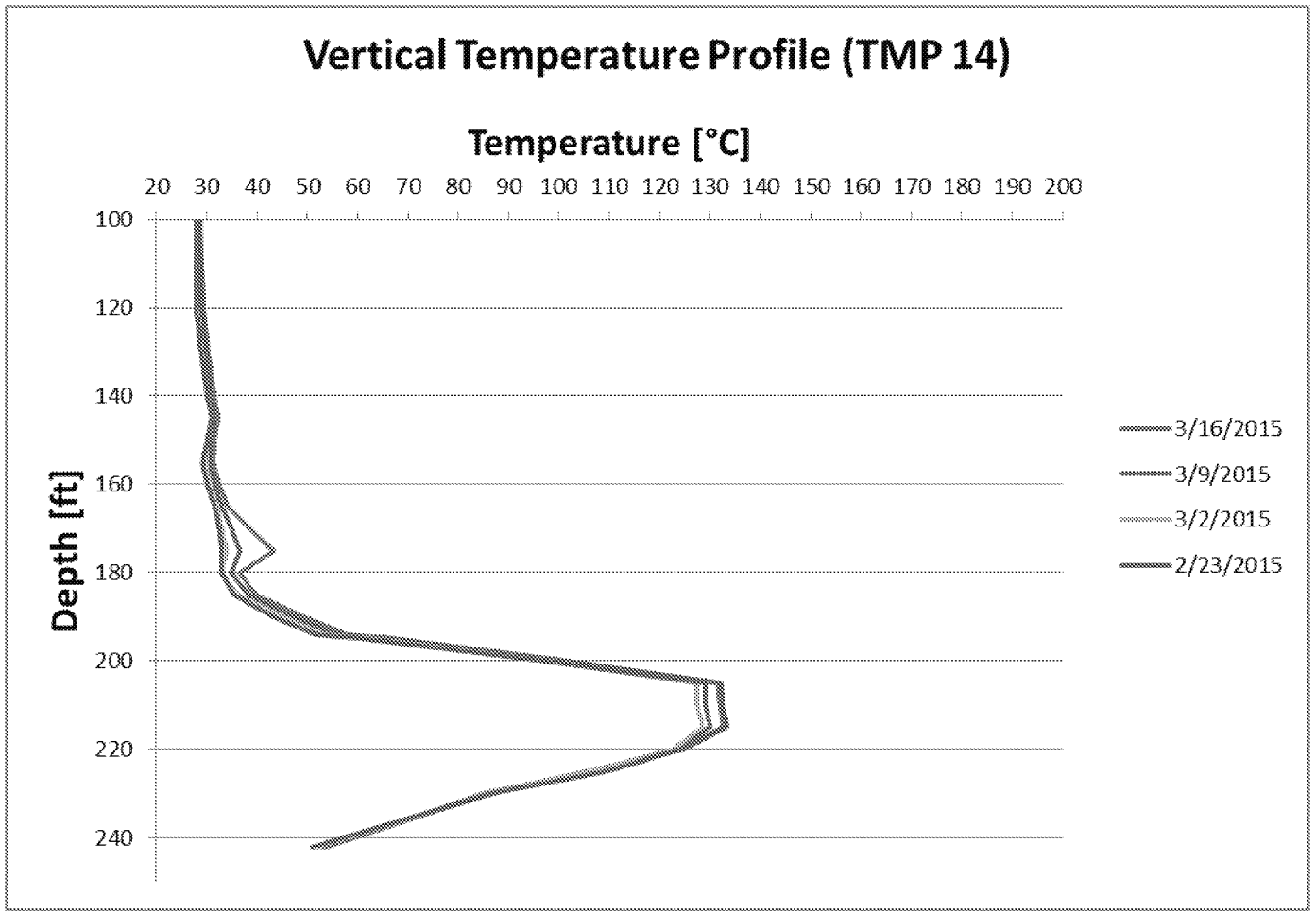

Vertical Temperature Profile (TMP 10)
Temperature [°C]
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Depth [ft]
100
120
140
160
180
200
220
240
3/16/2015
3/9/2015
3/2/2015
2/23/2015

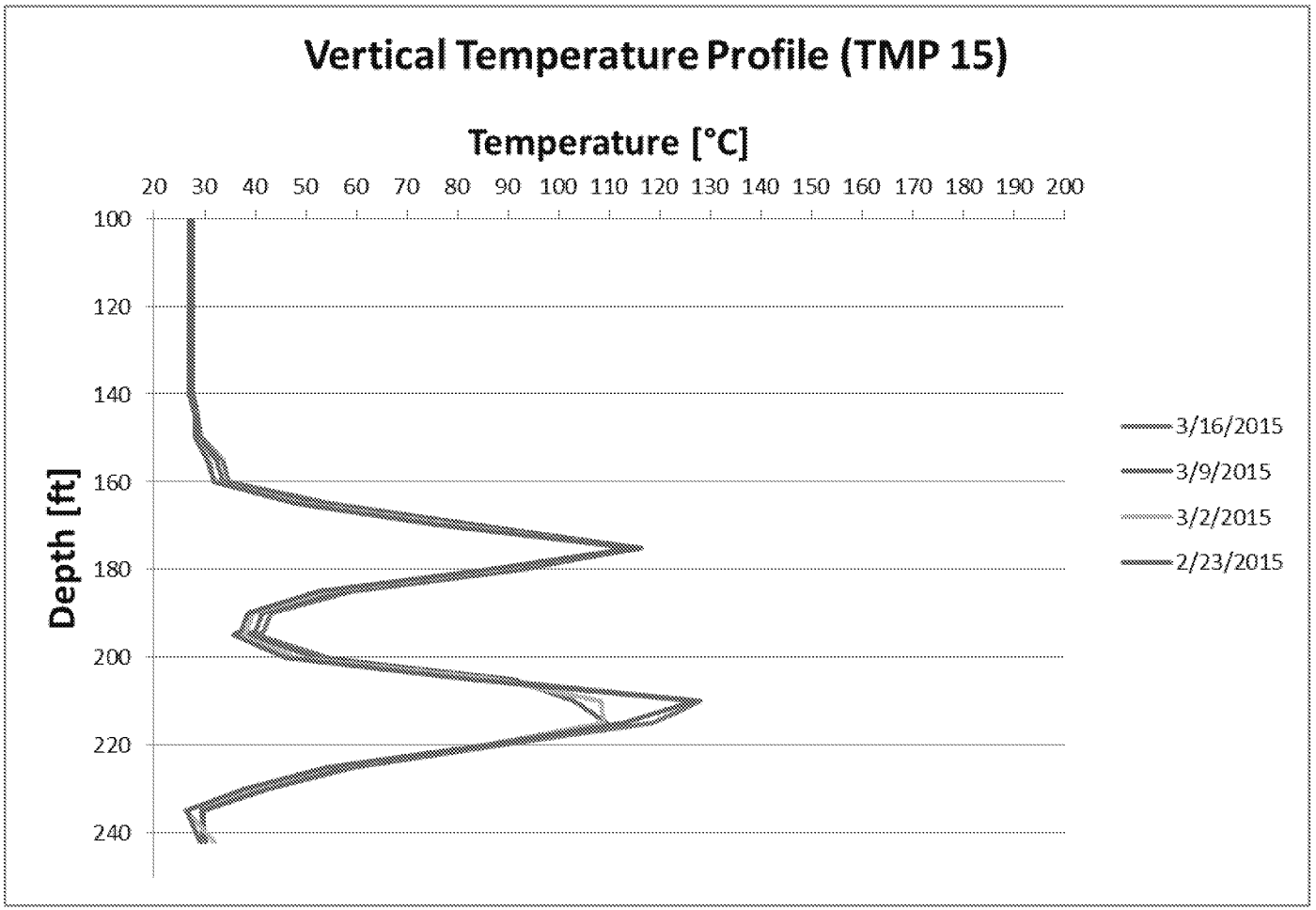

Vertical Temperature Profile (TMP 11)
Temperature [°C]
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Depth [ft]
100
120
140
160
180
200
220
240
3/16/2015
3/9/2015
3/2/2015
2/23/2015

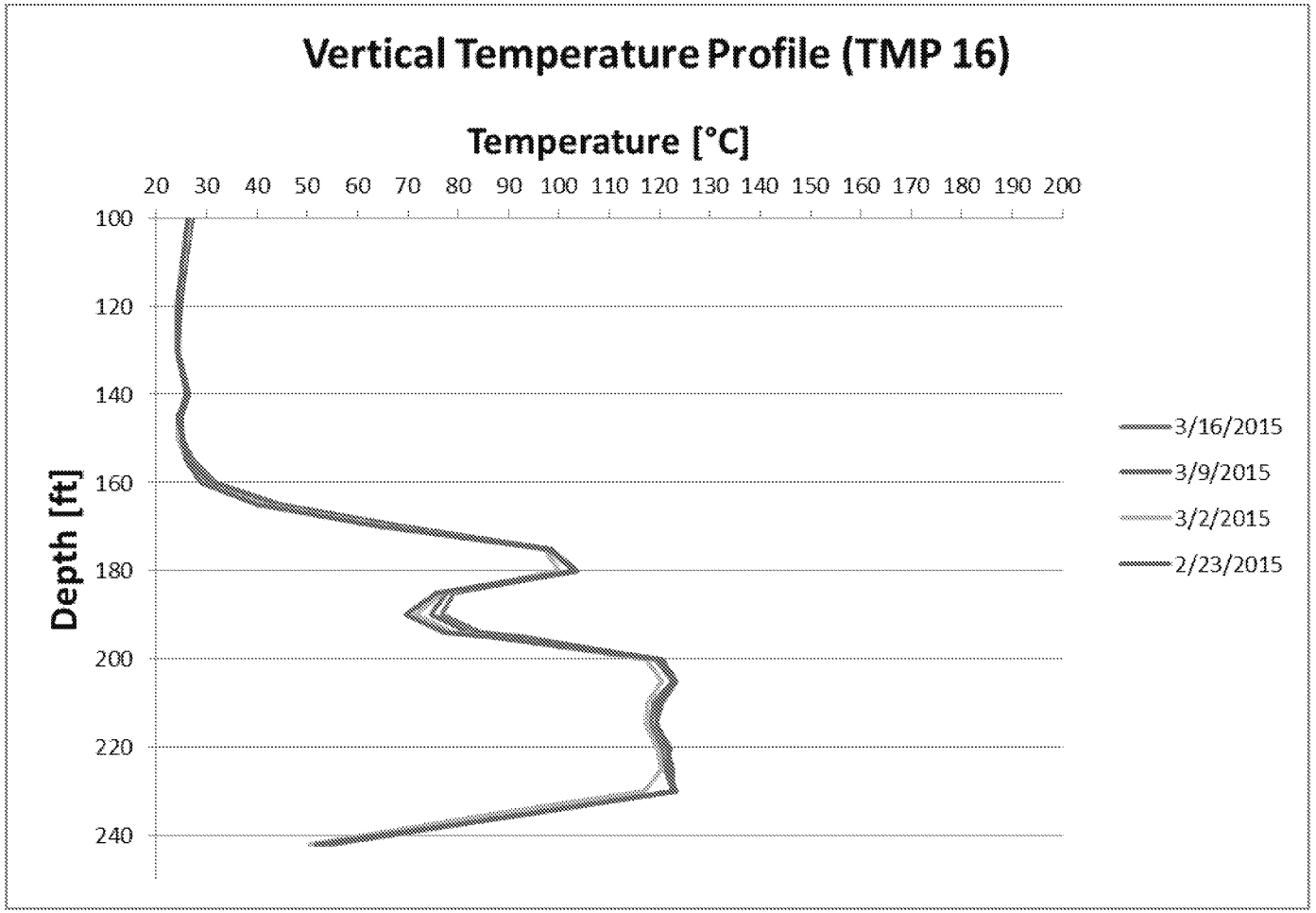

Vertical Temperature Profile (TMP 12)
Temperature [°C]
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Depth [ft]
100 120 140 160 180 200 220 240
3/16/2015
3/9/2015
3/2/2015
2/23/2015

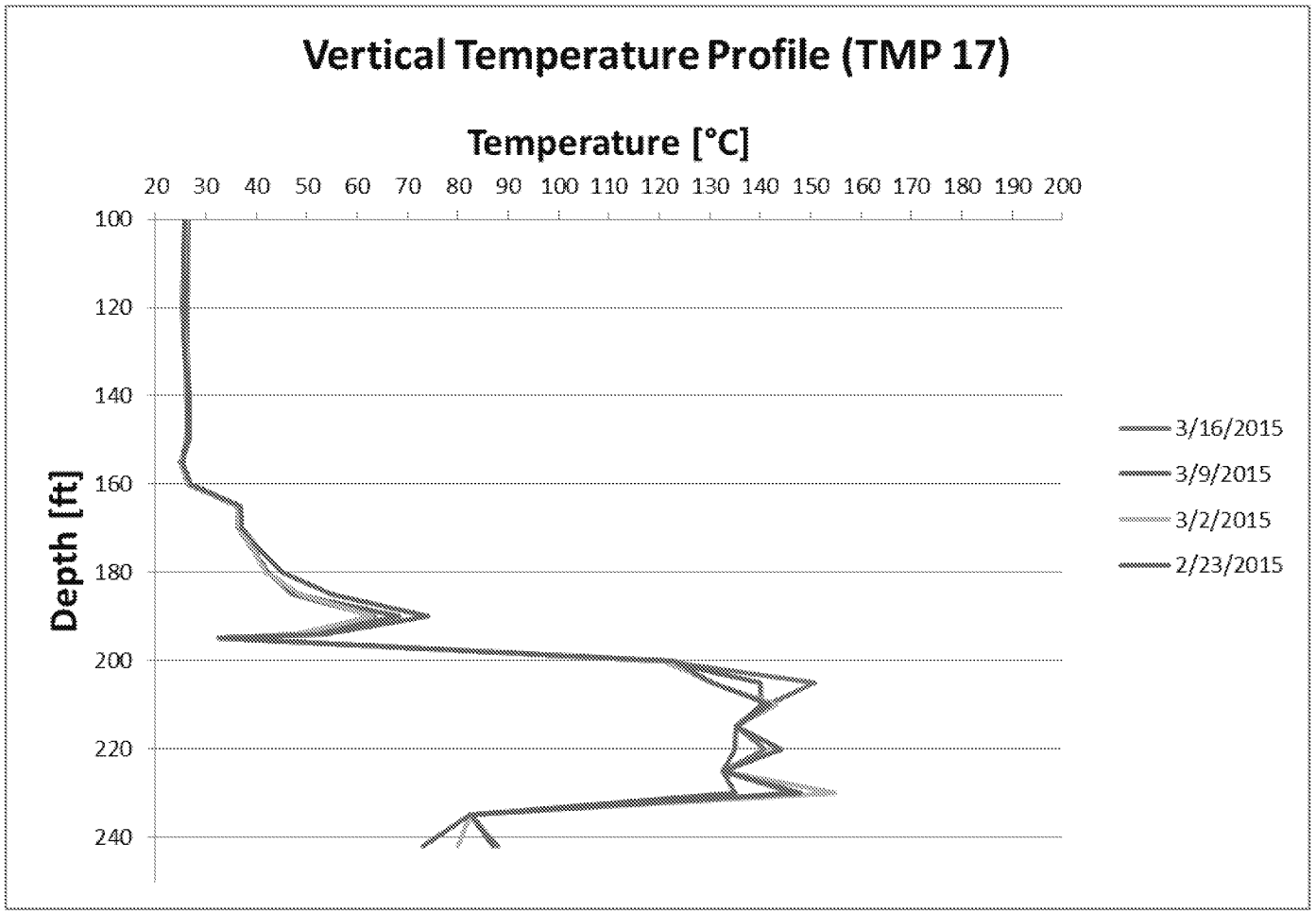



- The well casing at TMP13 has been confirmed as compromised and the temperature array has been removed from the well to prevent damage. The temperature array will be grouted in place to prevent vertical temperature smearing.


Vertical Temperature Profile (TMP 14)
Temperature [°C]
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Depth [ft]
100 120 140 160 180 200 220 240
3/16/2015
3/9/2015
3/2/2015
2/23/2015

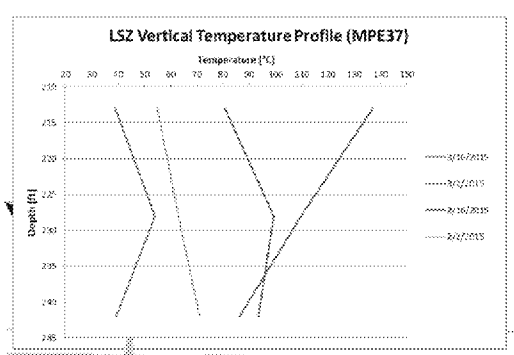

Vertical Temperature Profile (TMP 15)
Temperature [°C]
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Depth [ft]
100 120 140 160 180 200 220 240
3/16/2015
3/9/2015
3/2/2015
2/23/2015

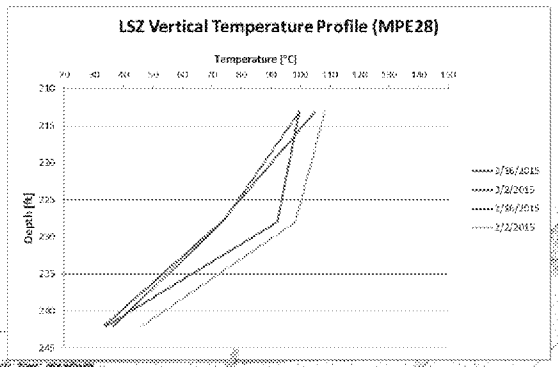

Vertical Temperature Profile (TMP 16)
Temperature [°C]
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Depth [ft]
100 120 140 160 180 200 220 240
3/16/2015
3/9/2015
3/2/2015
2/23/2015

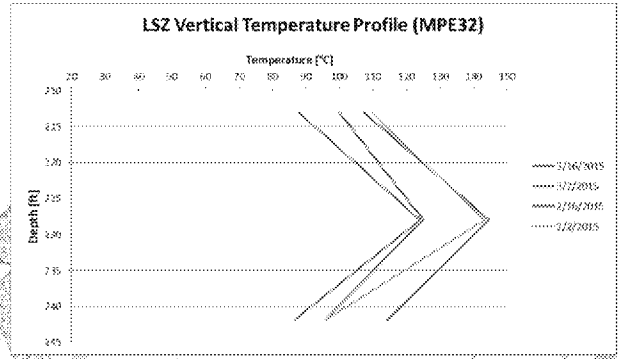

Vertical Temperature Profile (TMP 17)
Temperature [°C]
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Depth [ft]
100 120 140 160 180 200 220 240
3/16/2015
3/9/2015
3/2/2015
2/23/2015

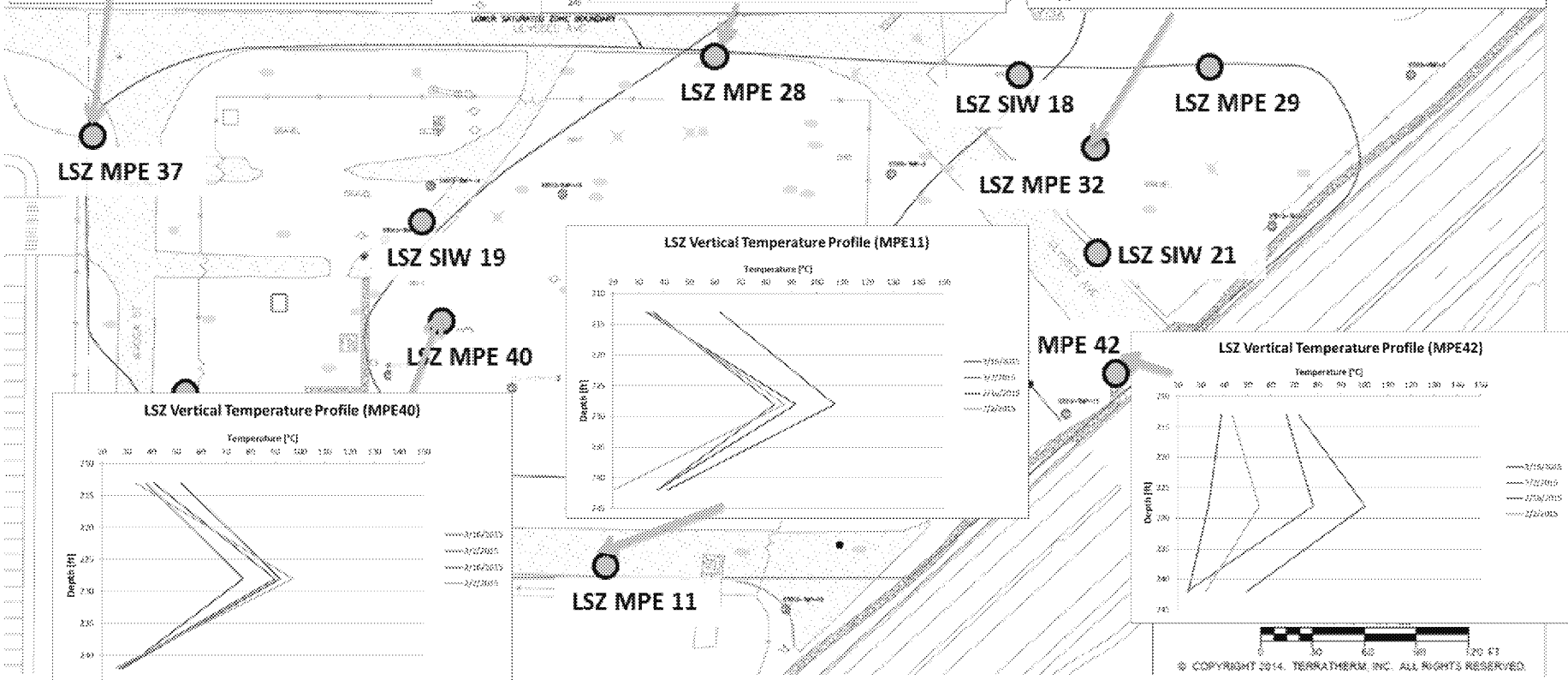
# *Subsurface Heat up Progression Measured at Co-Located Extraction Well Thermocouples*

# ST012 SEE CO-LOCATED TEMPERATURES AT LSZ EXTRACTION WELLS: 2/2-3/16



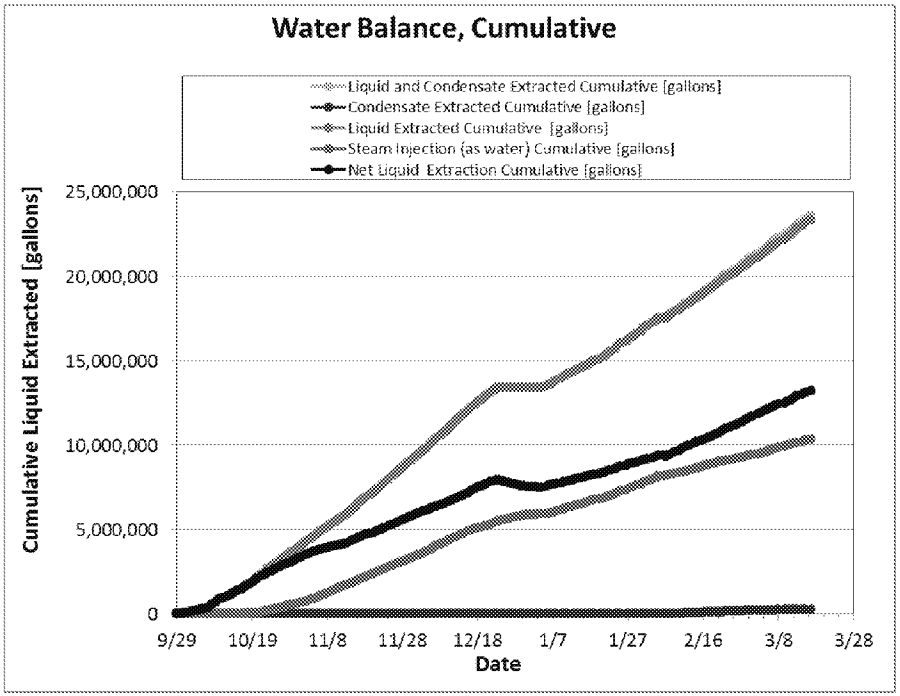



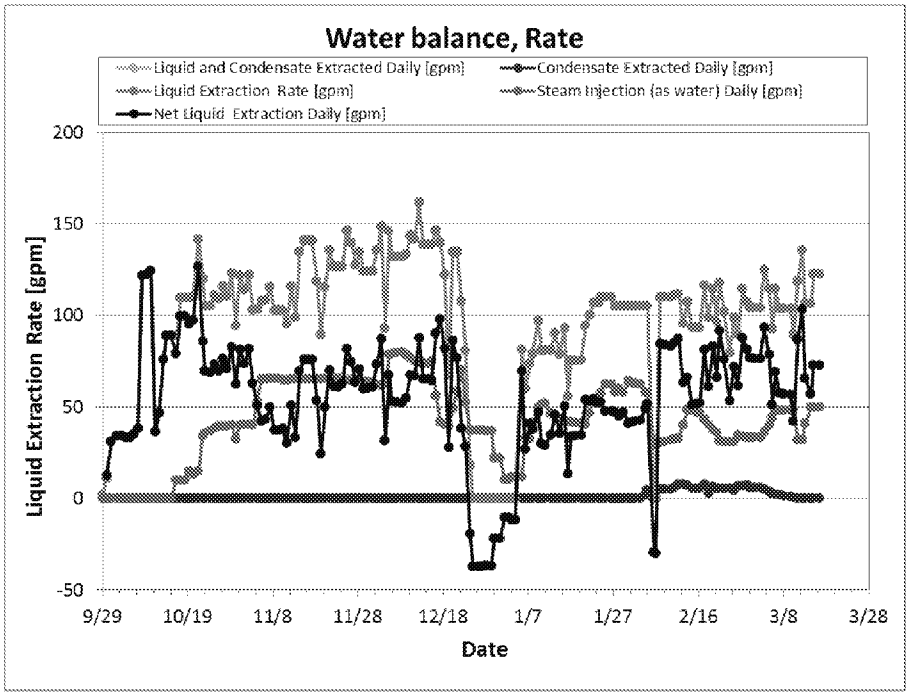



# ST012 Injection/Extraction Balance Status

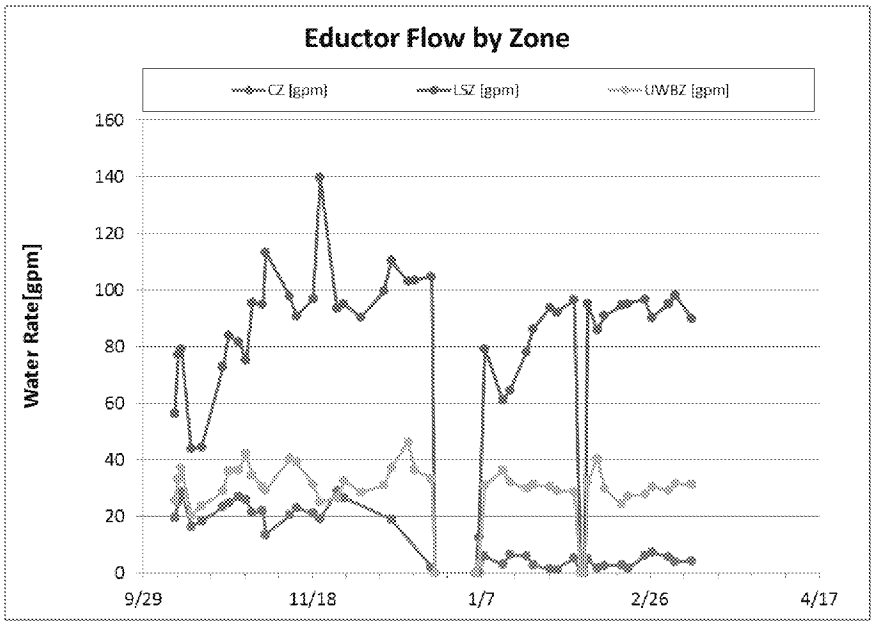
# ST012 SEE SYSTEM WATER BALANCE

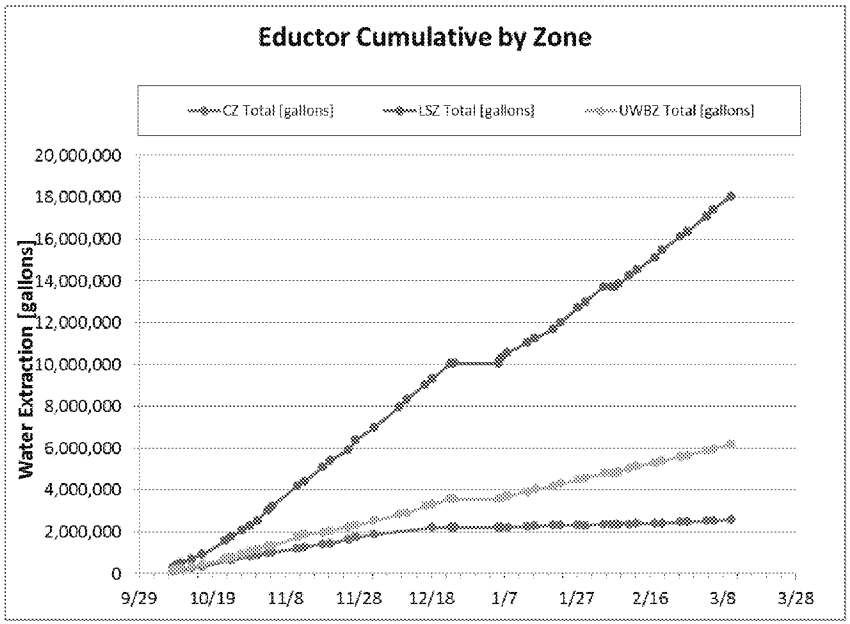



- **Condensate production began on 4 February indicating steam breakthrough at the first extraction well (LSZ6)**
- **Currently, the condensate production rate is ~0.1 gpm**

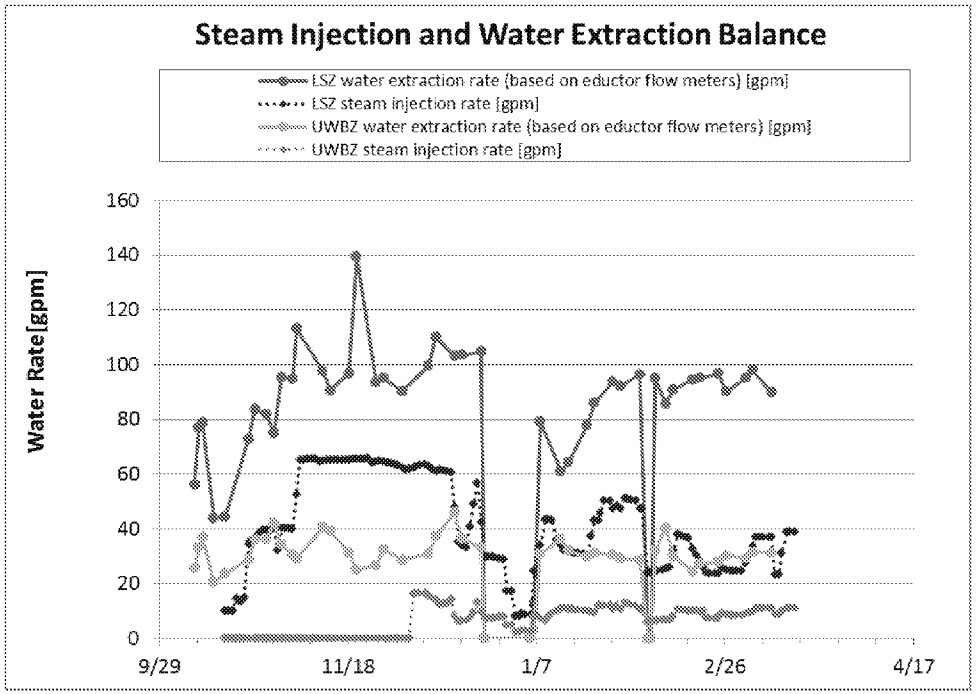
# ST012 SEE SYSTEM WATER EXTRACTION BY ZONE




- Eductor extraction rates per zone are based on individual eductor feed and return meters

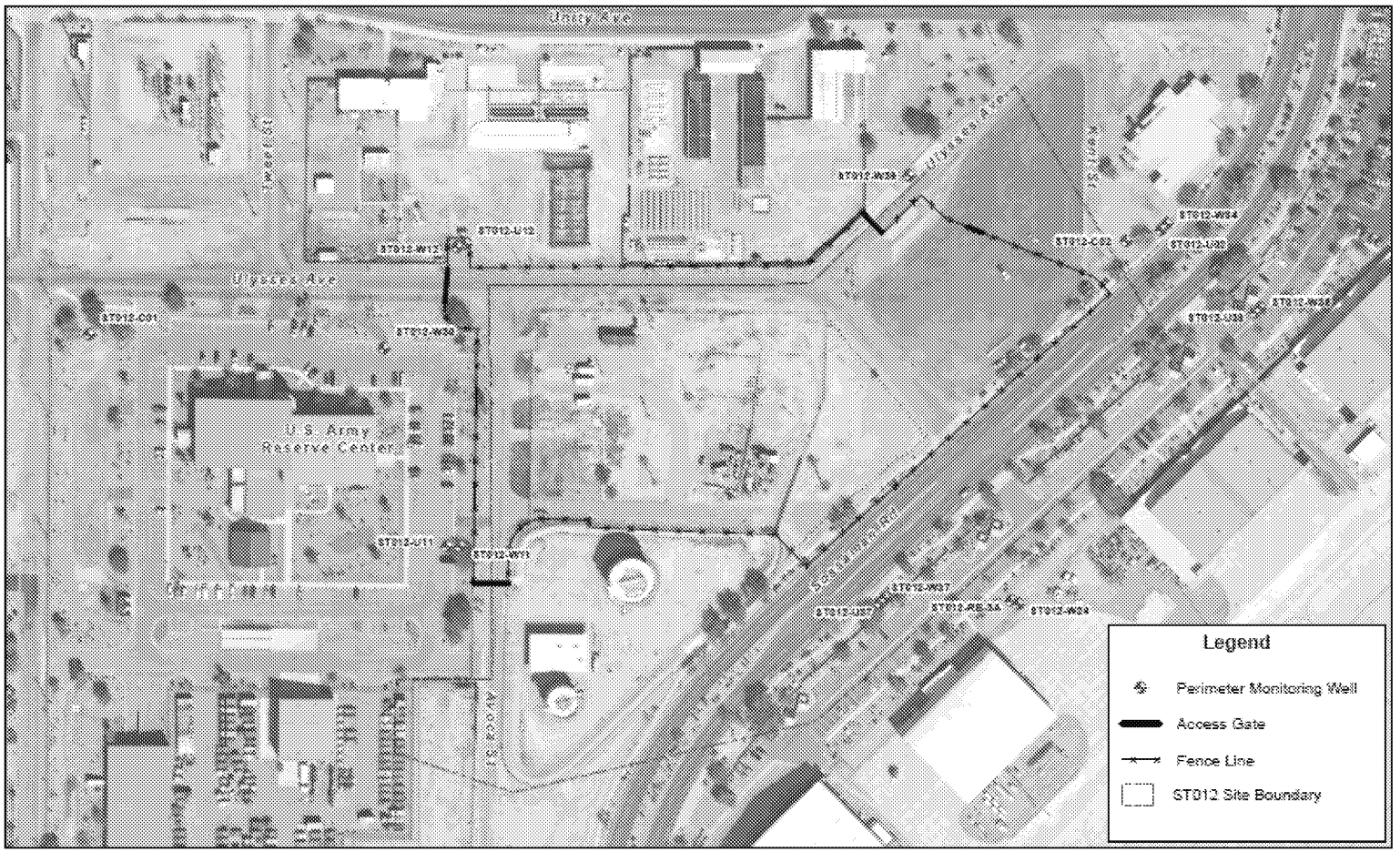
# ST012 SEE SYSTEM INJECTION/EXTRACTION BALANCE




| | CZ [gallons] | UWBZ [gallons] | LSZ [gallons] |
|---|---|---|---|
| Water extracted | 2,564,000 | 6,183,000 | 18,051,000 |
| Water injected (as steam) | 0 | 1,400,000 | 9,006,000 |
| Net extraction | 2,564,000 | 4,783,000 | 9,045,000 |

- Note: water extracted to date per zone is based on individual eductor meters

# ST012 SEE PERIMETER GROUNDWATER MONITORING WELLS

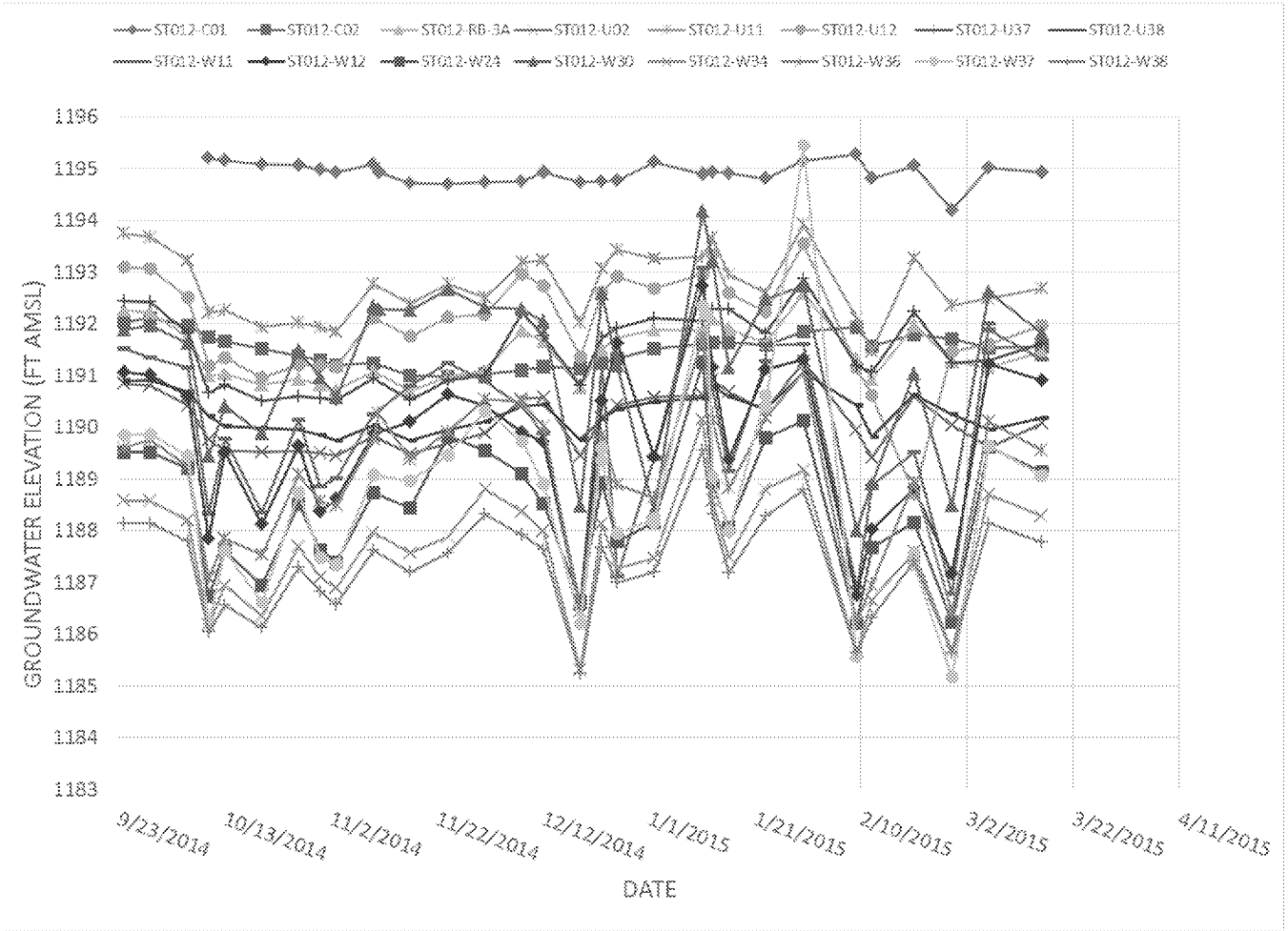



*Integrity - Service - Excellence*

# ST012 SEE PERIMETER GROUNDWATER LEVEL DATA

| Monitoring Well | 2/27/2015 | | 3/6/2015 | | 3/16/2015 | |
|---|---|---|---|---|---|---|
| | Change from Baseline | Change from Previous | Change from Baseline | Change from Previous | Change from Baseline | Change from Previous |
| **CZ/UWBZ Wells** | | | | | | |
| ST012-C01 | -1.07 | -0.82 | -0.25 | 0.85 | -0.34 | -0.05 |
| ST012-C02 | -0.34 | -0.07 | -0.52 | -0.15 | -0.49 | 0.07 |
| **UWBZ Wells** | | | | | | |
| ST012-RB-3A | -0.99 | -0.67 | -1.11 | -0.09 | -1.06 | -0.67 |
| ST012-U02 | -0.79 | -0.52 | -1.23 | -0.41 | -0.76 | 0.51 |
| ST012-U11 | -1.39 | -0.90 | -1.24 | 0.18 | -1.05 | 0.23 |
| ST012-U12 | -1.64 | 2.77 | -1.51 | 0.16 | -1.13 | 0.42 |
| ST012-U37 | -1.19 | -0.95 | -1.15 | 0.07 | -0.81 | 0.38 |
| ST012-U38 | -0.80 | -0.15 | -0.98 | -0.16 | -3.82 | -2.80 |
| **LSZ Wells** | | | | | | |
| ST012-W11 | -4.73 | -2.70 | 0.48 | 5.24 | 0.33 | -0.11 |
| ST012-W12 | -3.90 | -1.62 | 0.16 | 4.09 | -0.15 | -0.27 |
| ST012-W24 | -3.29 | -1.91 | 0.11 | 3.43 | -0.38 | -0.45 |
| ST012-W30 | -3.39 | -2.50 | 0.72 | 4.14 | -0.07 | -0.75 |
| ST012-W34 | -2.90 | -1.88 | 0.12 | 3.05 | -0.29 | -0.37 |
| ST012-W36 | -3.18 | -2.48 | 0.50 | 3.71 | -0.05 | -0.51 |
| ST012-W37 | -2.53 | -0.22 | -4.71 | -2.15 | -0.26 | 4.49 |
| ST012-W38 | -2.50 | -1.73 | 0.00 | 2.53 | -0.37 | -0.33 |

# ST012 SEE PERIMETER GROUNDWATER ELEVATIONS




- **Water level increases are temporary**

# ST012 SEE OPERATIONAL CHALLENGES

- Iron Fouling
- Bio Fouling
- Eductor Pump Pulling and Transition Piece Replacement
- Perimeter Water Levels
- Temperature Monitoring Point Thermocouple Repair/Maintenance
- Boiler Maintenance
- Heat Response at TMP10
- Product at ST012-W37 and ST012-W11

# ST012 SEE PERIMETER LNAPL THICKNESSES (FT)

| Monitoring Well | 2/27/2015 | 3/6/2015 | | 3/16/2015 |
|---|---|---|---|---|
| **CZ/UWBZ Wells** | | Before bailing | After Bailing | |
| ST012-C01 | 0.00 | 0.00 | 0.00 | 0.00 |
| ST012-C02 | 0.00 | 0.00 | 0.00 | 0.00 |
| **UWBZ Wells** | | | | |
| ST012-U02 | 0.00 | 0.00 | 0.00 | 0.00 |
| ST012-U11 | 0.00 | 0.00 | 0.00 | 0.00 |
| ST012-U12 | 0.00 | 0.00 | 0.00 | 0.00 |
| ST012-U37 | 0.00 | 0.00 | 0.00 | 0.00 |
| ST012-U38 | 0.00 | 0.00 | 0.00 | 0.00 |
| ST012-RB-3A | 0.00 | 0.00 | 0.00 | 0.00 |
| **LSZ Wells** | | | | |
| ST012-W11 | 0.72 | 1.95 | 0.19 | 0.68 |
| ST012-W12 | 0.00 | 0.00 | 0.00 | 0.00 |
| ST012-W24 | 0.00 | 0.00 | 0.00 | 0.00 |
| ST012-W30 | 0.00 | 0.00 | 0.00 | 0.00 |
| ST012-W34 | 0.00 | 0.00 | 0.00 | 0.00 |
| ST012-W36 | 0.00 | 0.00 | 0.00 | 0.00 |
| ST012-W37 | 4.09 | 1.67 | 1.67 | 4.80 |
| ST012-W38 | 0.00 | 0.00 | 0.00 | 0.00 |

# ST012 SEE REVISED OPERATIONAL STRATEGY

- Continue to run system at approximately 400 gpm (eductor loop flow)
- Increase extraction flow when the de-foamer and bio control tests are complete
- Ramp up steam injection when preventative replacement of selected eductor transition pieces is complete (*to be complete this week*) and both boilers are back online
- Continue to monitor perimeter temperature response and make operational adjustments as necessary

# ST012 SEE OPERATIONAL PLAN – UPDATE

## Operational Plan through April

- **Continue operating the current SIW wells at reduced input until both boilers are online.**
  - Fifteen of the exterior and interior LSZ wells operating
  - All seven exterior UWBZ steam wells are operating
  - Total system is operating at approximately 110 gpm liquid extraction and 50 gpm steam injection (25,000 lbs/hr)
- **Complete Modified Step 3 (once both boilers are online)**
  - Fifteen exterior and interior LSZ wells are operating
  - Seven exterior UWBZ wells are operating
  - No CZ wells operating
  - Total system operating at ~120 gpm liquid extraction and 60 gpm steam injection (30,000 lbs/hr)
  - Balancing the flows to maintain an acceptable water balance
  - Look for options to increase and optimize injection and extraction rates
- **Modified Step 4 (interior UWBZ)**
  - Same 15 exterior and interior LSZ wells as Step 3
  - Same exterior UWBZ wells as Step 3
  - Add interior UWBZ wells
  - Injection rates will continue to be balanced across the wellfield to maintain an acceptable water balance

# Site ST012 SVE System Update

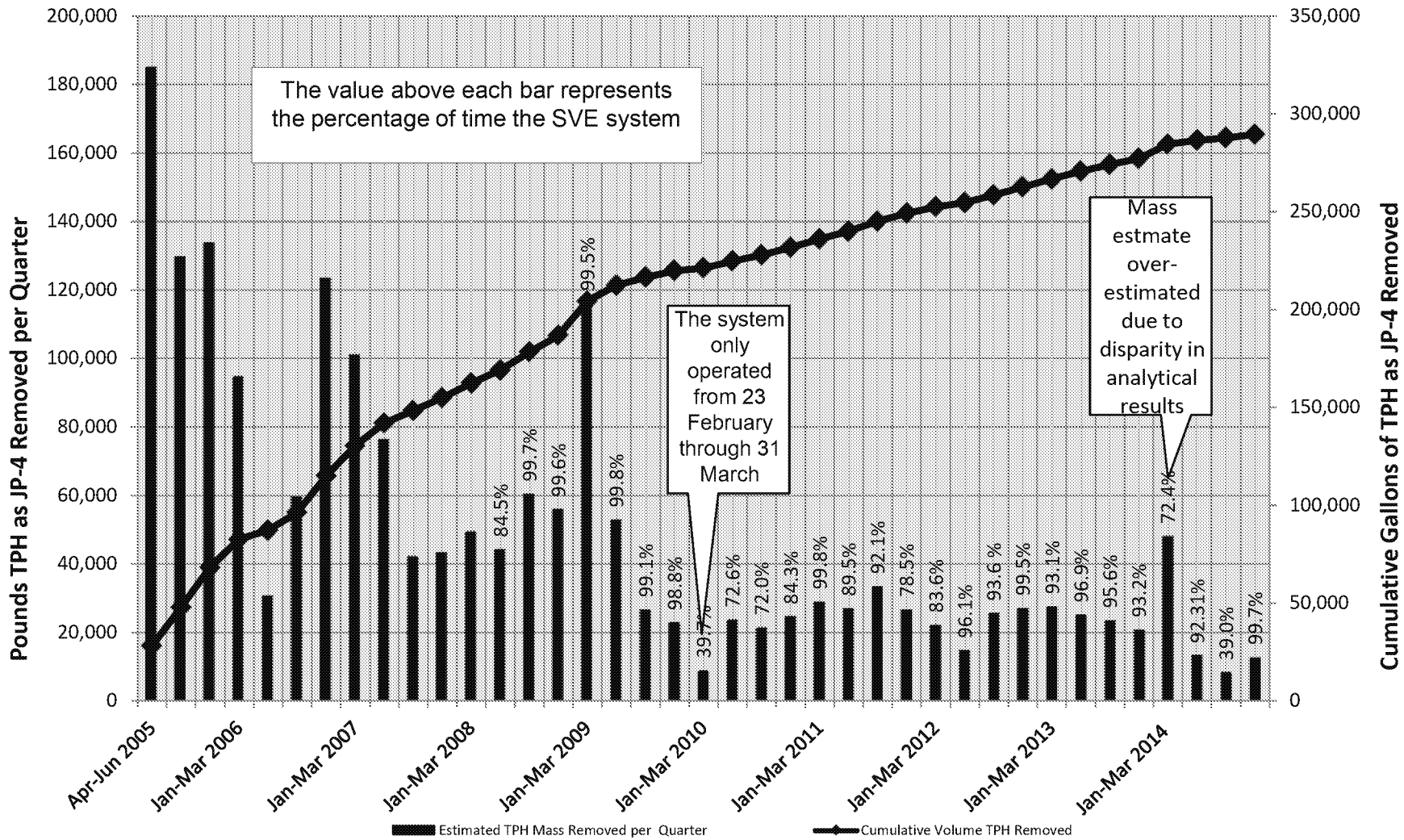
## Jul – Sep 2014

- 39% operational uptime; Shut down during SEE construction
- TPH removed – 8,070 pounds or 1,230 gallons
- 7 deep wells disconnected in Aug 2014

## Sep – Dec 2014

- 99% operational uptime
- TPH removed – 12,500 pounds or 1,900 gallons
- 8 of 27 SVE wells operating
- 5 new wells added in Sept 2014

# Site ST012 SVE System Performance



# Site ST012 SVE System Summary

- TPH removed thru Dec 2014 – 290,000 gallons
- Next SVE performance monitoring – Mar 2015
- Mass removal for the SVE system is likely to increase during SEE operations.

# Headquarters U.S. Air Force

*Integrity - Service - Excellence*

## Site Spill Control Measures

# Headquarters U.S. Air Force

*Integrity - Service - Excellence*

## W37 LNAPL Procedures

# Headquarters U.S. Air Force

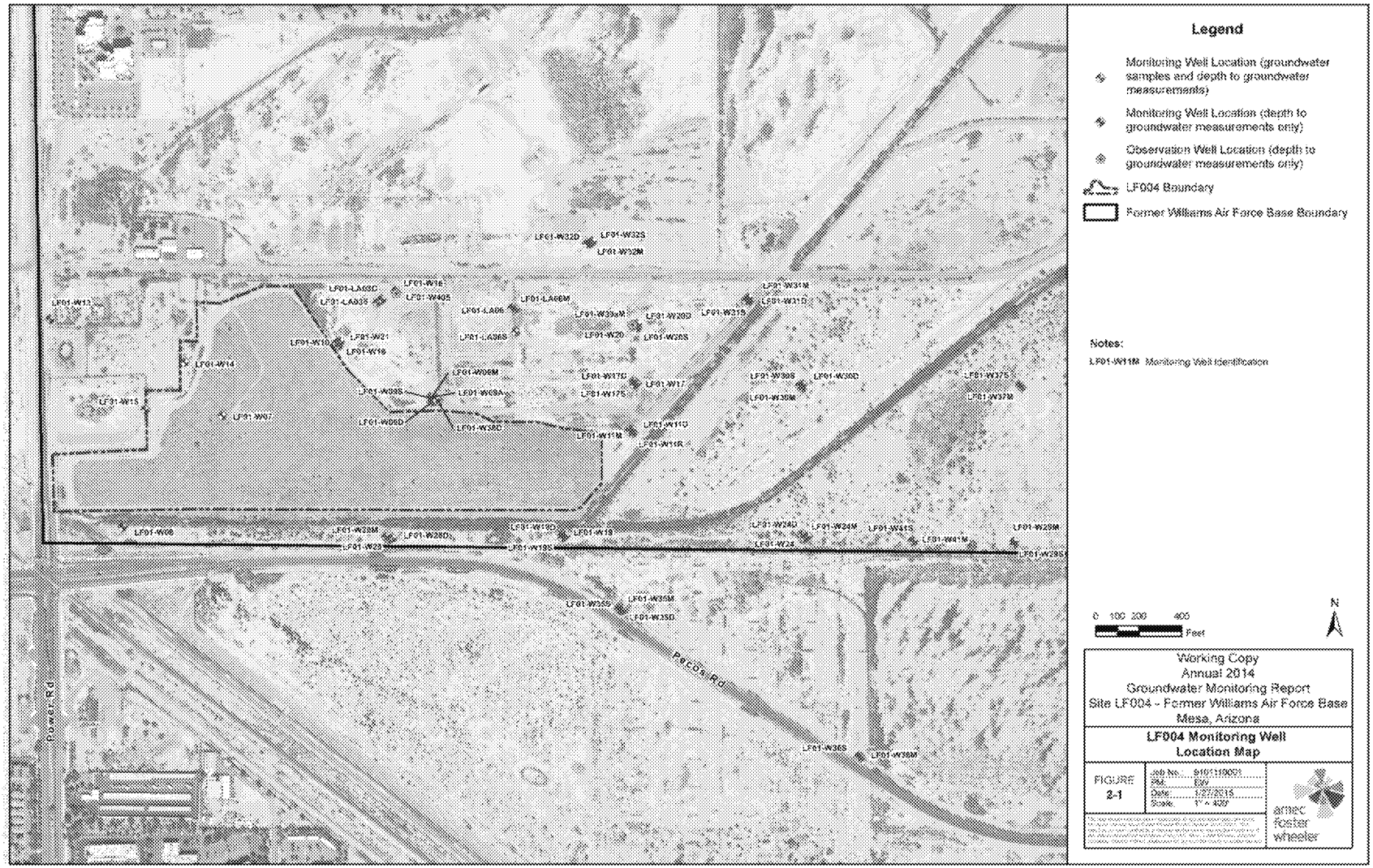
***Integrity - Service - Excellence***

## EBR Update

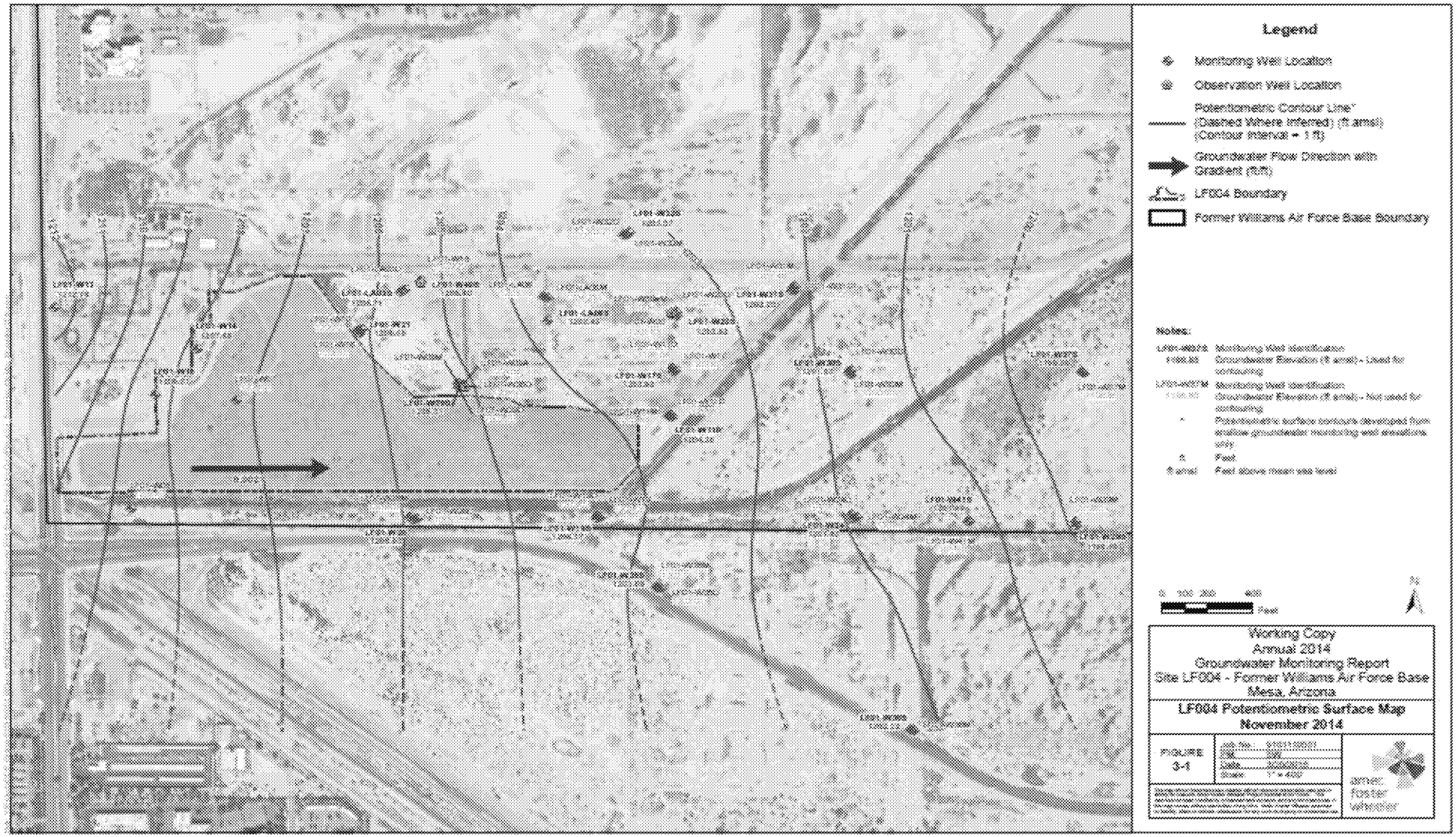
# Site LF004
# Landfill

# REMEDIAL ACTION

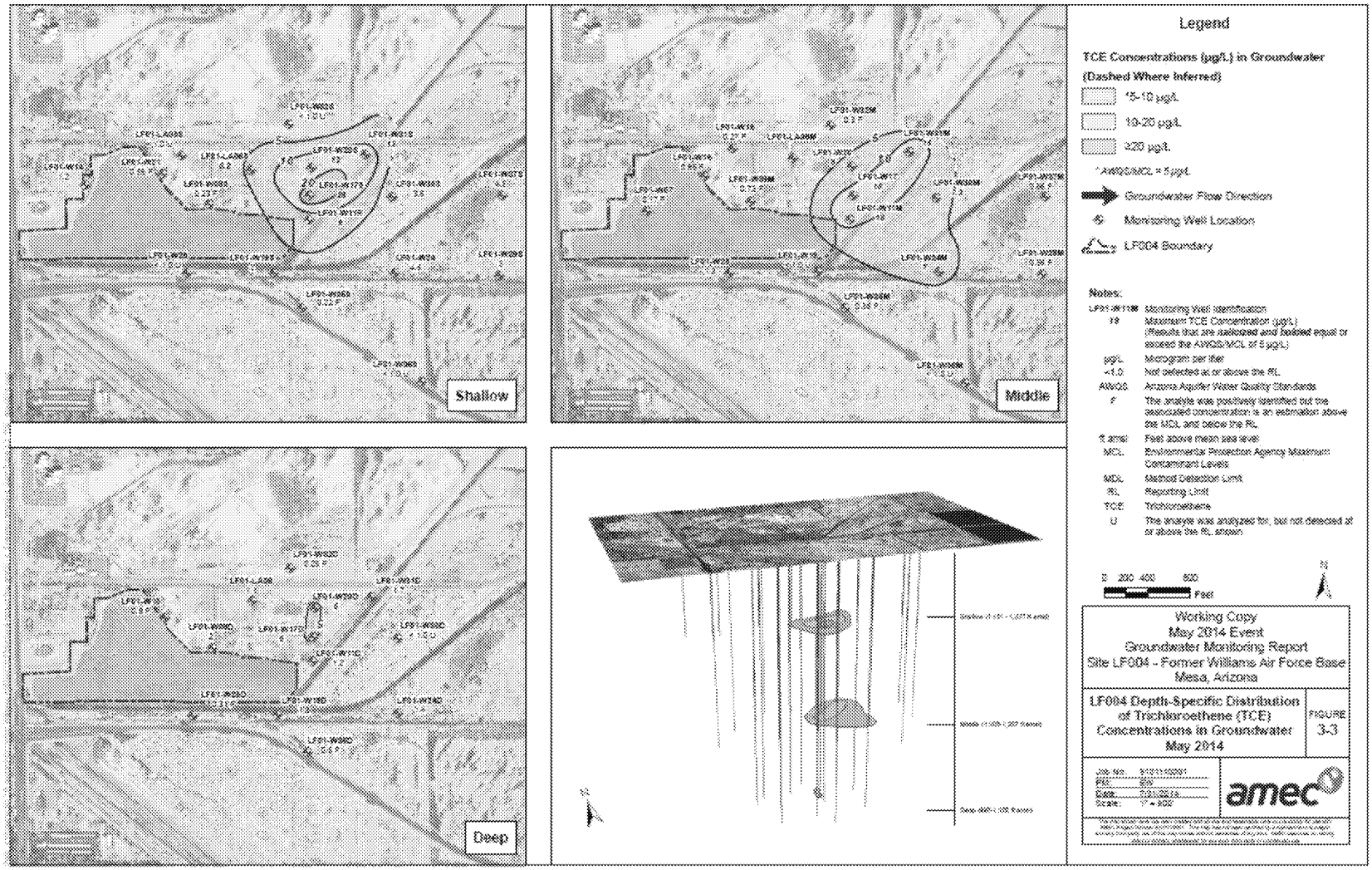
# Site LF004 GW Monitoring Update
# Well Locations



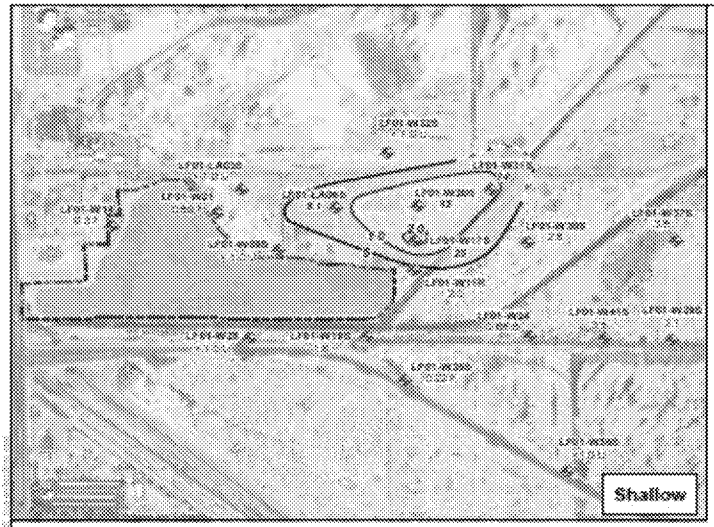
# Site LF004 GW Monitoring Update
# Flow Direction - November 2014

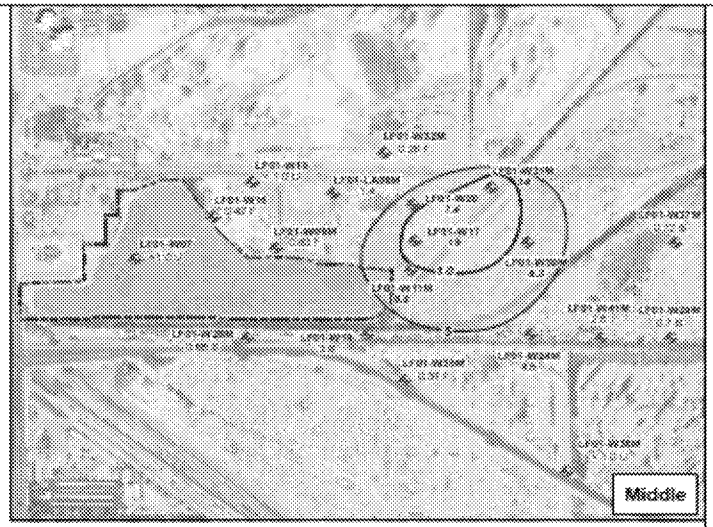


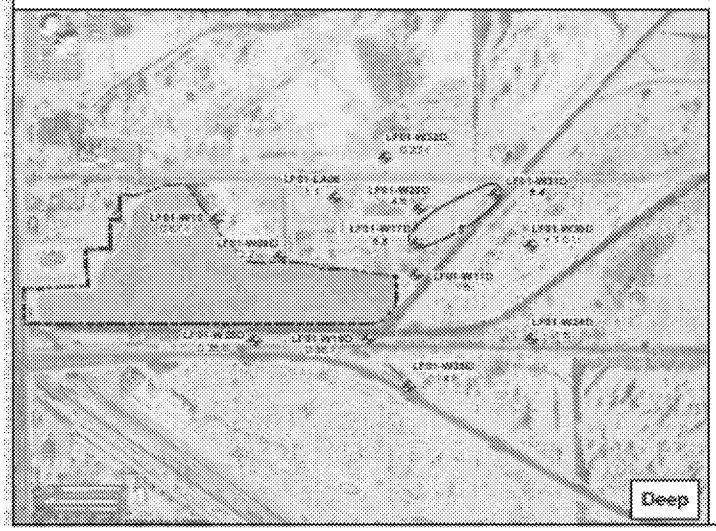
# Site LF004 GW Monitoring Update
# TCE Isoconcentration Map - May 2014

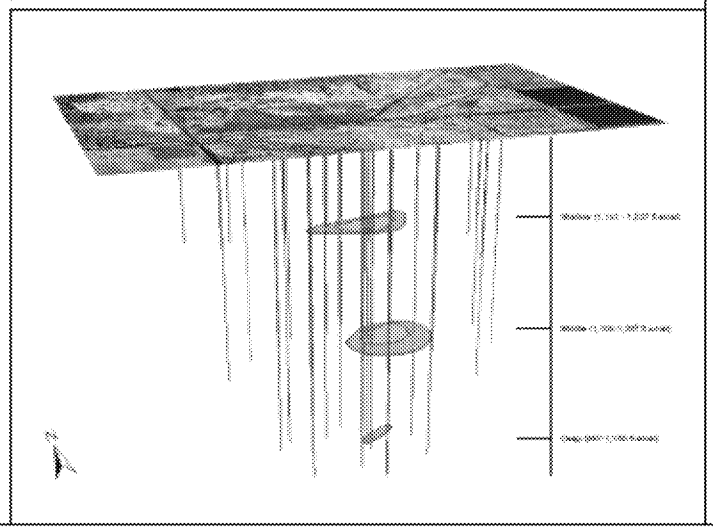


# Site LF004 GW Monitoring Update
# TCE Isoconcentration Map - November 2014



Legend

TCE Concentrations (µg/L) in Groundwater
(Dashed Where Inferred)

- 5-10 µg/L
- 10-20 µg/L
- ≥20 µg/L

* AWQS/MCL = 5 µg/L

- Monitoring Well Location
- LF004 Boundary

Notes:

| | |
|---|---|
| LF01-W01S | Monitoring Well Identification |
| XX | Maximum TCE Concentration (µg/L) (Results that are detected and bolded equal or exceed the AWQS/MCL of 5 µg/L) |
| µg/L | Micrograms per liter |
| <1.0 | Not detected at or above the RL |
| AWQS | Arizona Aquifer Water Quality Standards |
| B | The analyte was positively identified, blank contamination |
| F | The analyte was positively identified but the associated concentration is an estimation above the MDL and below the RL |
| ft amsl | Feet above mean sea level |
| MCL | Environmental Protection Agency Maximum Contaminant Levels |
| MDL | Method Detection Limit |
| RL | Reporting Limit |
| TCE | Trichloroethene |
| U | The analyte was analyzed for, but not detected at or above the RL shown |

0 200 400 800 Feet

N

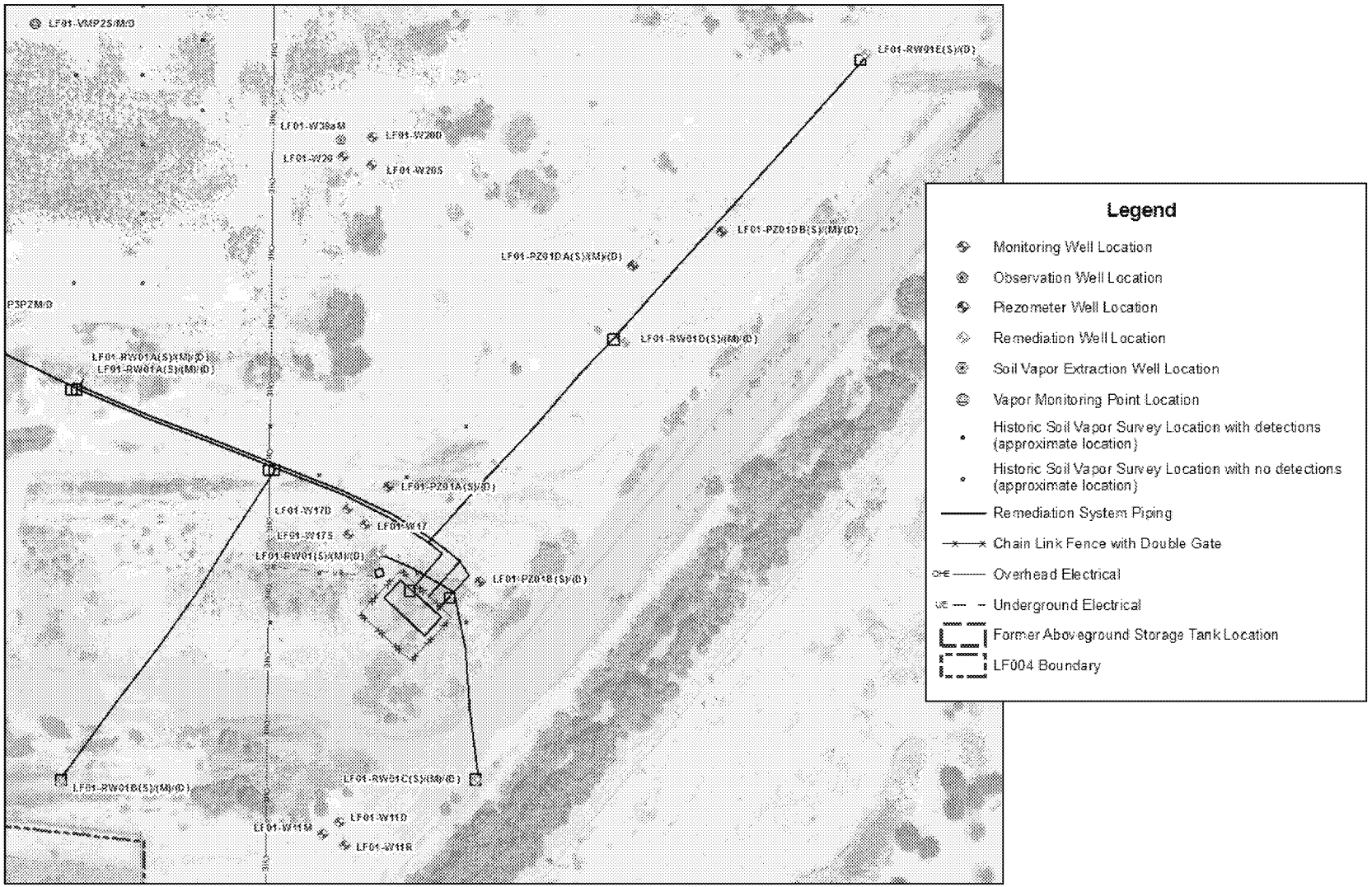
Working Copy
Annual 2014
Groundwater Monitoring Report
Site LF004 - Former Williams Air Force Base
Mesa, Arizona

LF004 Depth-Specific Distribution of Trichloroethene (TCE) Concentrations in Groundwater November 2014

FIGURE 3-3

amec foster wheeler

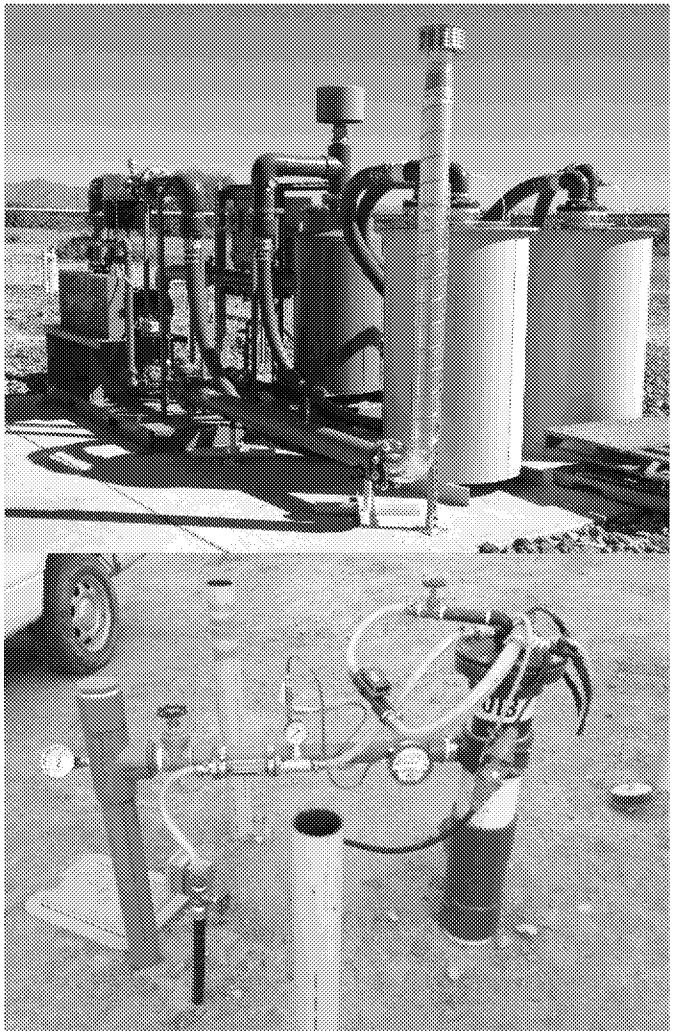
# Site LF004
# LF01-W17 Area IWAS System Update



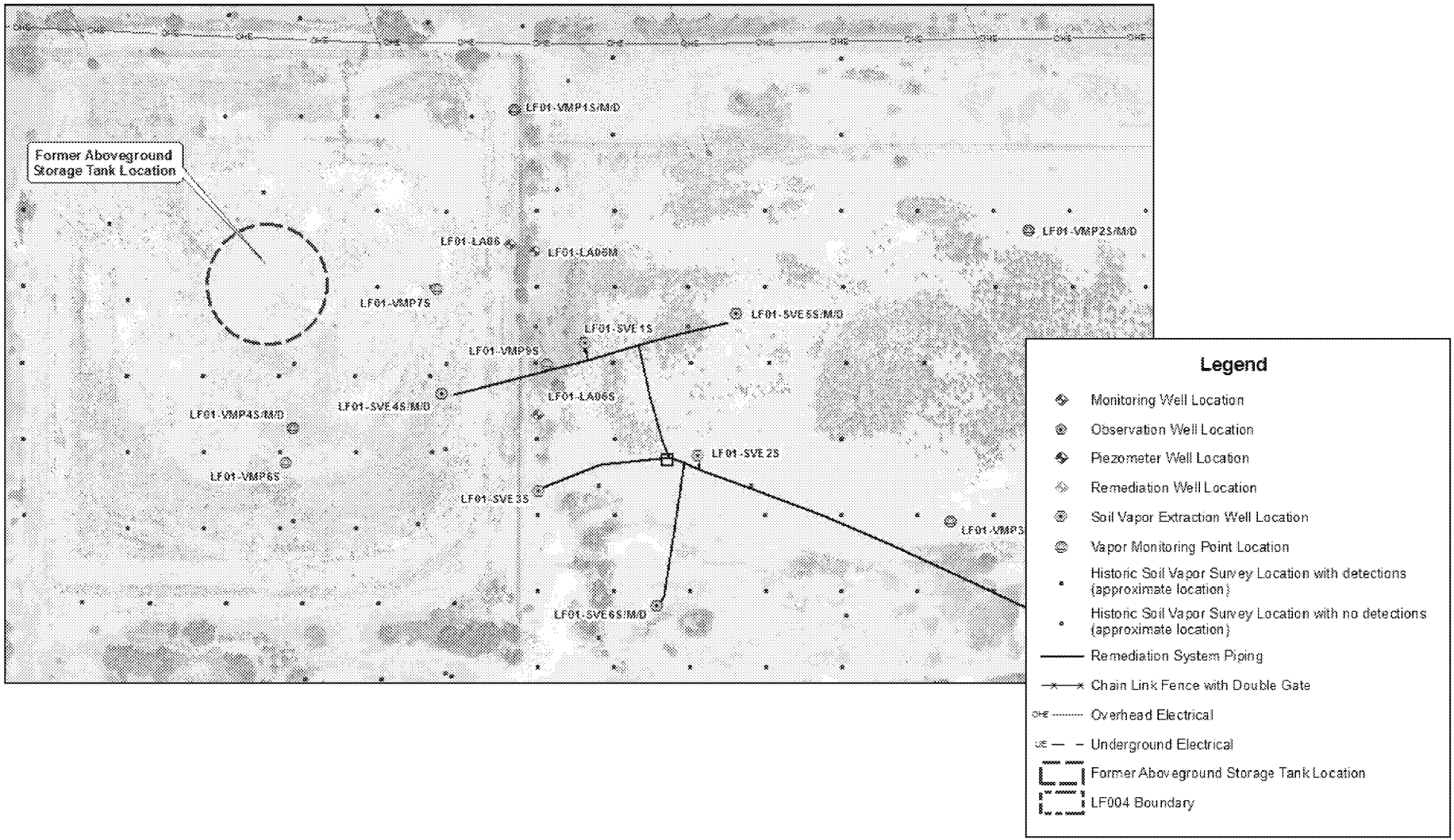
# Site LF004
# LF01-W17 Area IWAS System Update

## Operations Summary Thru 8 Mar 2015

- Began operation 29 Aug 2014
- Approximate 93% quarterly operational uptime
- Inlet TCE and PCE concentrations in extracted vapor were 79 and 149 µg/m$^3$ respectively, thru 8 Mar 2015
- Estimated 4.19 pounds of TCE and PCE removed by vapor extraction
- All remediation wells operating (groundwater pumping, air sparging, and vapor extraction) except for RW-1 (no vapor extraction)
- Maintenance to remove accumulation of scaling on air sparge nozzles and well screens completed for RW01
- Oxidant injection will began at RW01 in Mar 2015



# Site LF004
# Former AST SVE System Update






ED_005025_00005937-00061

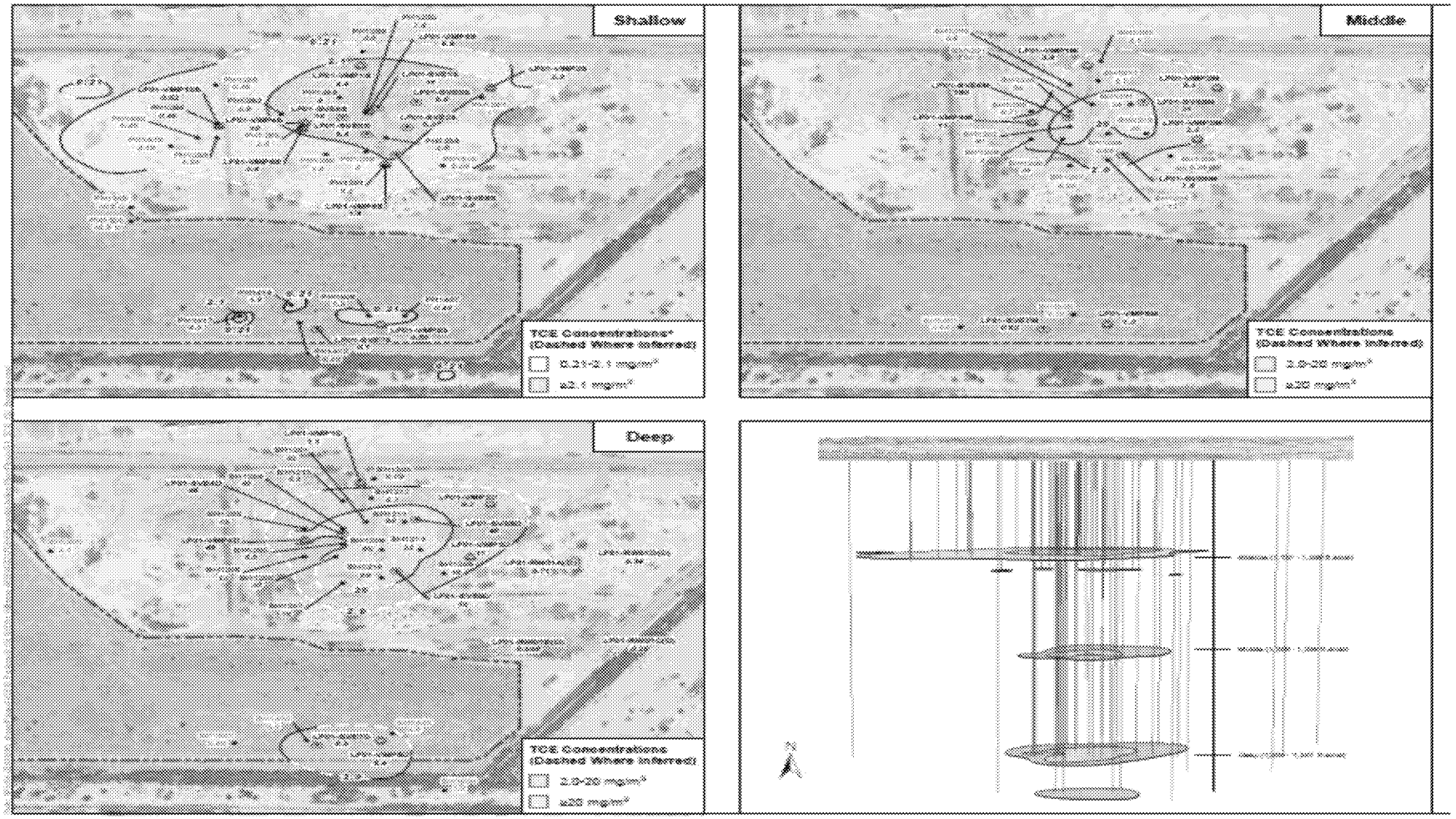
# Site LF004
# Former AST SVE System Update

## Operations Summary Thru 8 Mar 2015

- Began operation 09 Sep 2014
- Approximate 97% quarterly operational uptime; system down for several days to install replacement VLS tank
- TCE and PCE concentrations in extracted vapor were 3,000 to 490 $\mu g/m^3$ respectively, thru 8 Mar 2015
- Estimated 50.51 pounds of TCE and PCE removed
- Five wells currently operational (4S/M/D, 5M/D, 6D); highest TCE and PCE concentrations in deeper SVE wells
- Based on quarterly performance sampling results, connect VMP-2 to SVE system for additional soil gas treatment in March

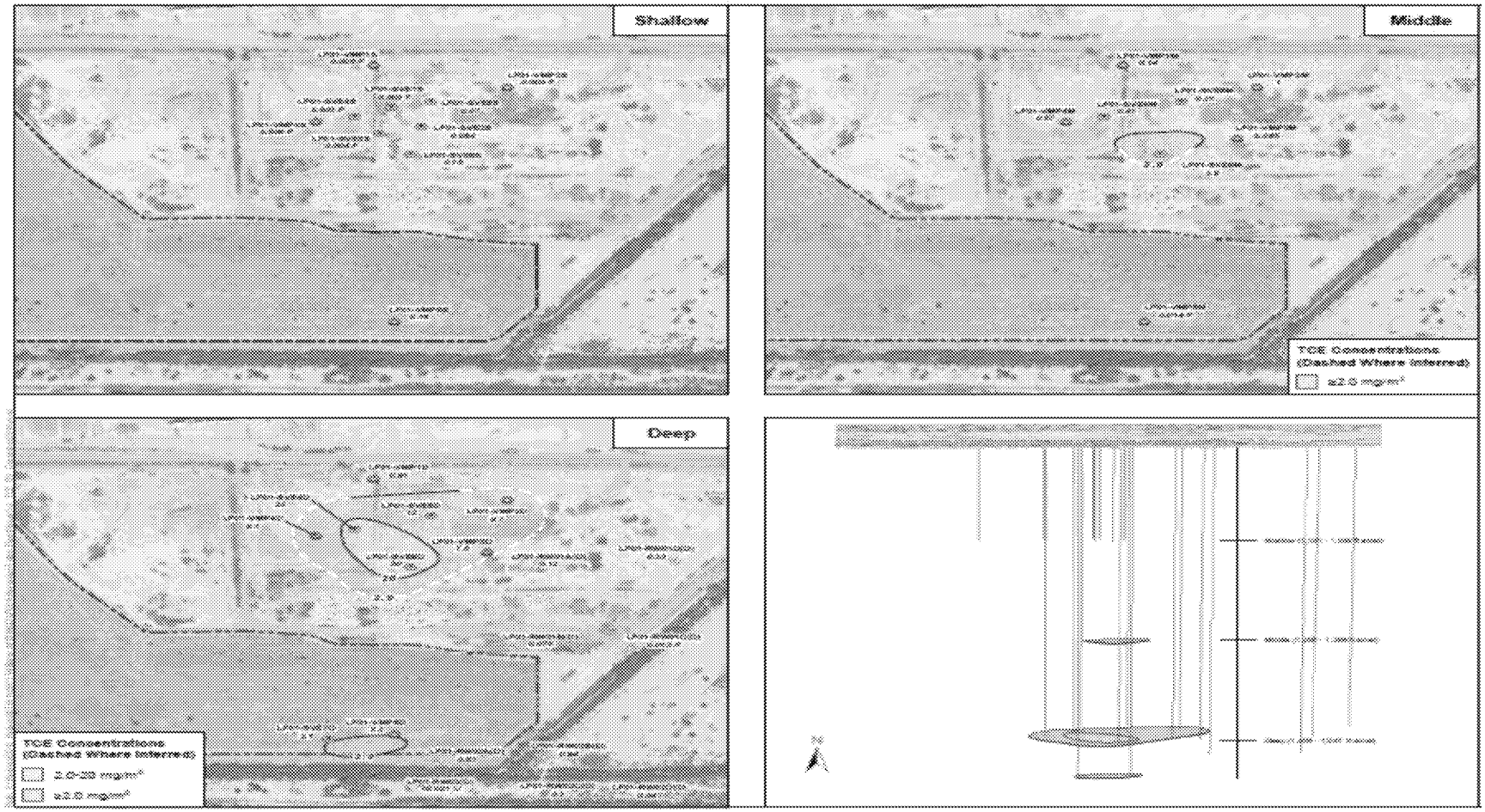
# Site LF004 TCE Soil Vapor September 2014

Prior to treatment

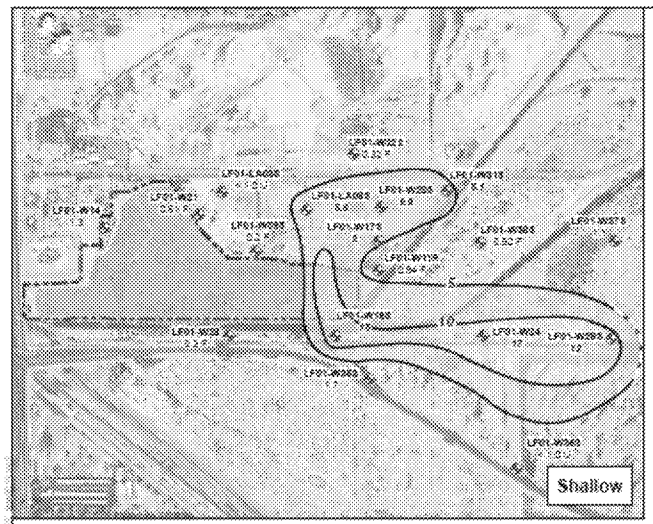


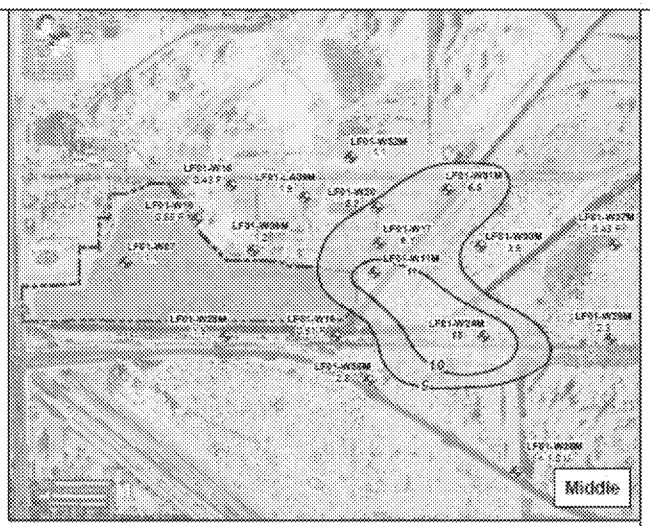
# Site LF004 TCE Soil Vapor December 2014

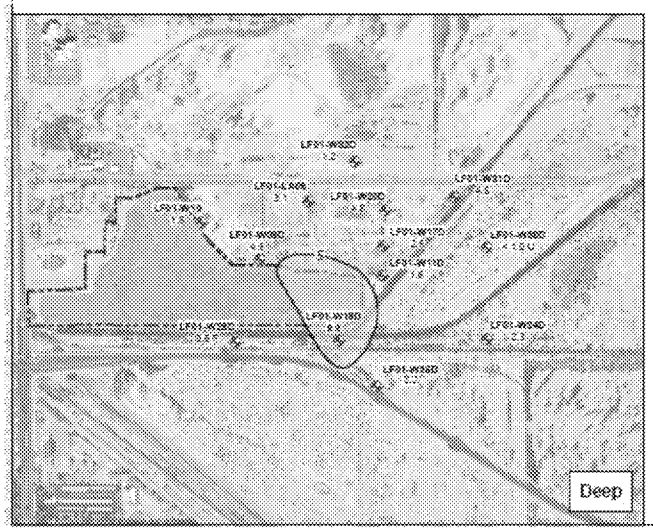
After 3 months of operation

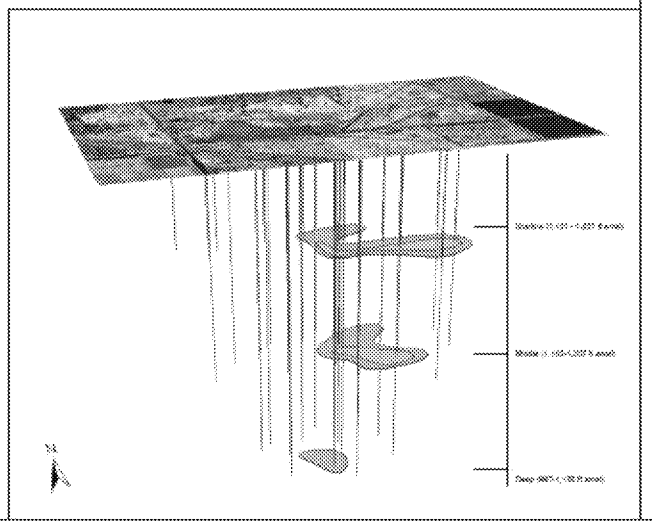


# Site LF004 GW Monitoring Update
# PCE Isoconcentration Map – May 2014



Legend

PCE Concentrations (µg/L) in Groundwater

- 5-10 µg/L
- 10-20 µg/L
- ≥20 µg/L

* AWQS/MCL = 5 µg/L

- Groundwater Flow Direction
- Monitoring Well Location
- LF004 Boundary

Notes:

| | |
|---|---|
| LF01-W11M | Monitoring Well Identification |
| 11 | Maximum PCE Concentration (µg/L) (Results that are italicized and bolded equal or exceed the AWQS/MCL of 5 µg/L) |
| µg/L | Micrograms per liter |
| <1.0 | Not detected at or above the RL |
| AWQS | Arizona Aquifer Water Quality Standards |
| F | The analyte was positively identified but the associated concentration is an estimation above the MDL and below the RL |
| ft amsl | Feet above mean sea level |
| MCL | Environmental Protection Agency Maximum Contaminant Levels |
| MDL | Method Detection Limit |
| RL | Reporting Limit |
| PCE | Perchloroethene |
| U | The analyte was analyzed for, but not detected at or above the RL shown |

0 200 400 800 Feet

N

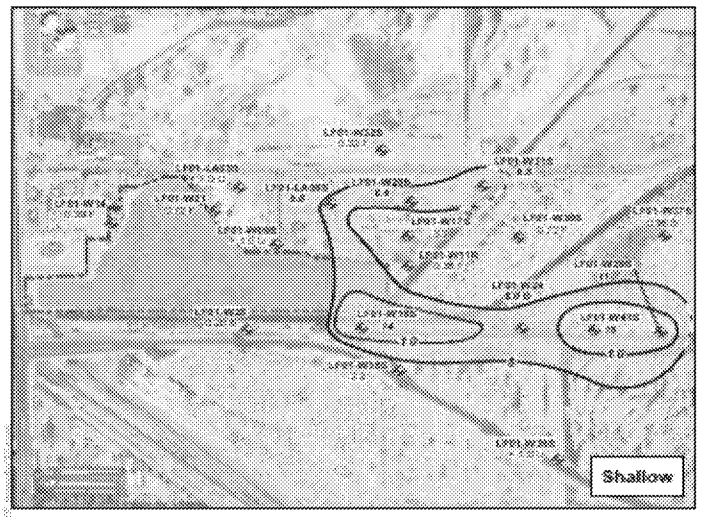
Working Copy
May 2014 Event
Groundwater Monitoring Report
Site LF004 - Former Williams Air Force Base
Mesa, Arizona

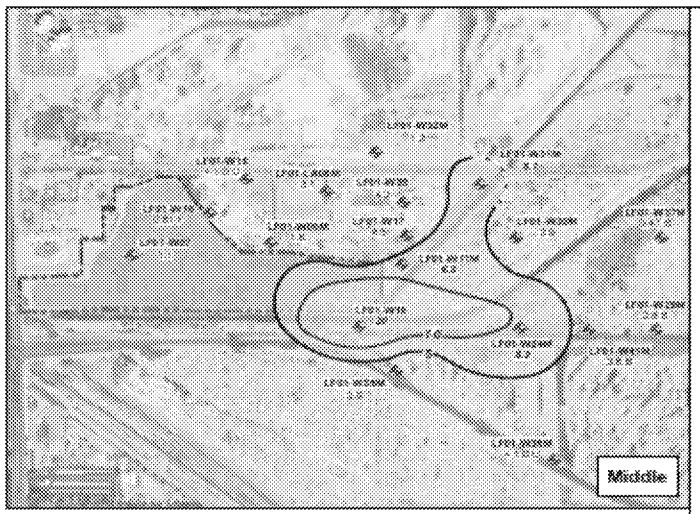
LF004 Depth-Specific Distribution of Perchloroethene (PCE) Concentrations in Groundwater May 2014

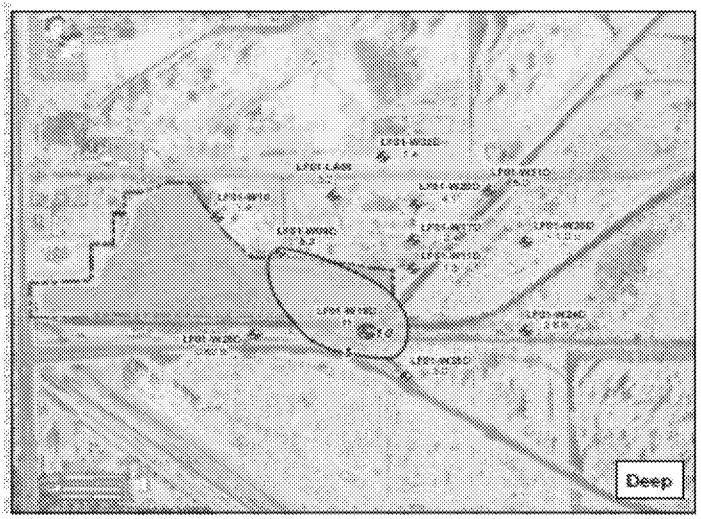
FIGURE 3-5

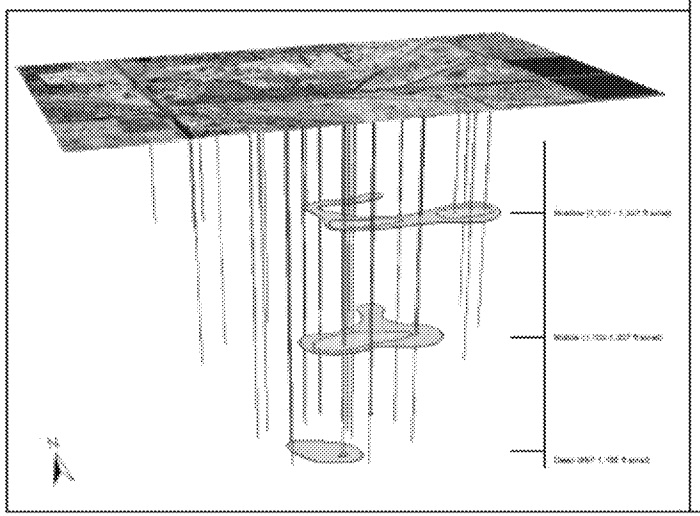
amec

# Site LF004 GW Monitoring Update
# PCE Isoconcentration Map – November 2014



Legend

PCE Concentrations (µg/L) in Groundwater

(Dashed Where Inferred)

5-10 µg/L

10-20 µg/L

* AWQS/MCL = 5 µg/L

Monitoring Well Location

LF004 Boundary

Notes:

LF01-W113R — Monitoring Well Identification

8 — Maximum PCE Concentration (µg/L) (Results that are Rejected and Surrogate equal or exceed the AWQS/MCL of 5 µg/L)

µg/L — Micrograms per liter

<1.0 — Not detected at or above the RL

AWQS — Arizona Aquifer Water Quality Standards

B — The analyte was positively identified, blank contamination

J — The analyte was positively identified but the associated concentration is an estimation above the MDL and below the RL

ft amsl — Feet above mean sea level

MCL — Environmental Protection Agency Maximum Contaminant Levels

MDL — Method Detection Limit

RL — Reporting Limit

PCE — Tetrachloroethene

U — The analyte was analyzed for, but not detected at or above the RL shown

0 200 400 800 Feet

N

Working Copy
Annual 2014
Groundwater Monitoring Report
Site LF004 - Former Williams Air Force Base
Mesa, Arizona

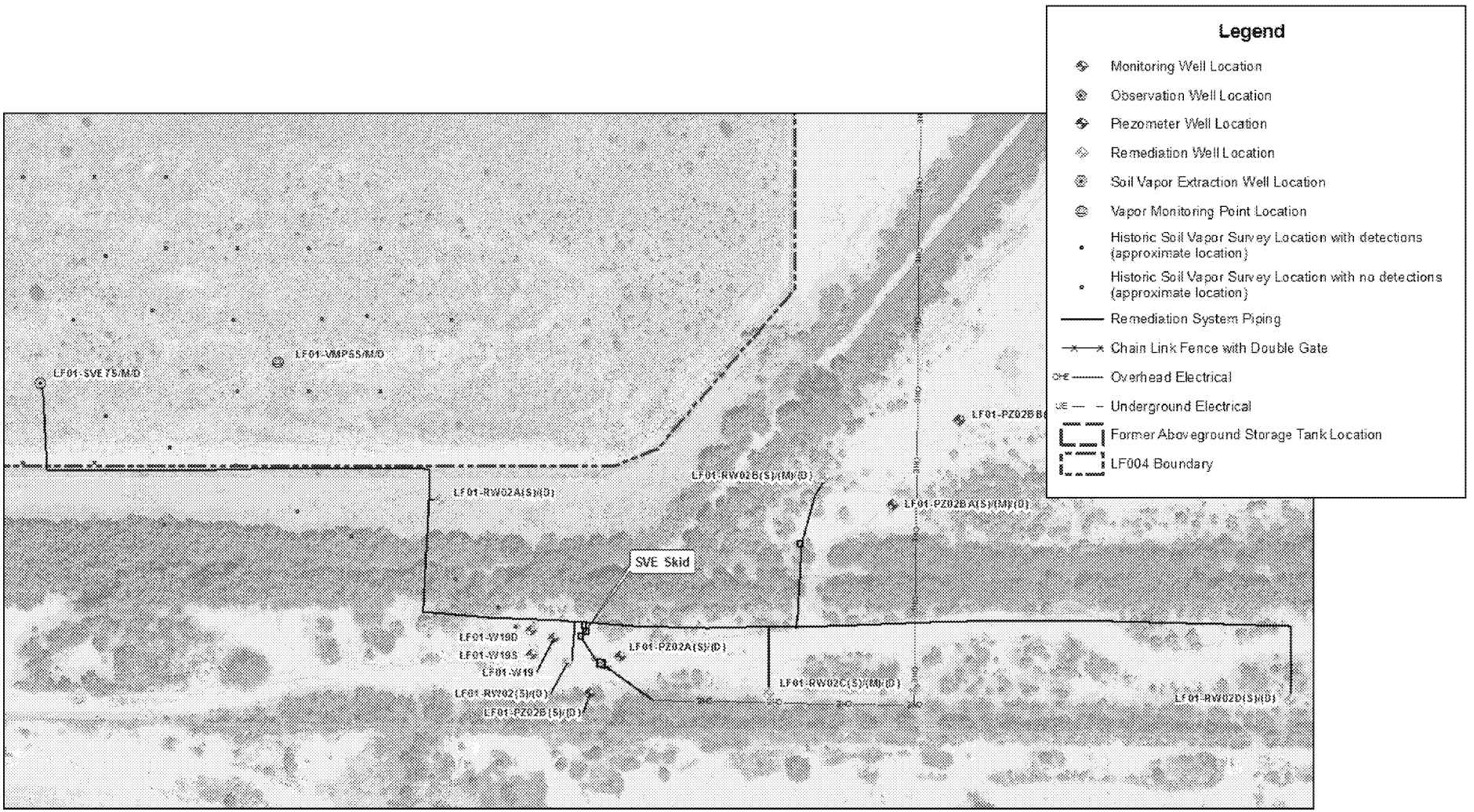
LF004 Depth-Specific Distribution of Tetrachloroethene (PCE) Concentrations in Groundwater November 2014

FIGURE 3-5

Job No. 61401/0000
CAD By: BW
Date: 3/11/2015
Scale: 1" = 400'

AECOM
Foster Wheeler

# Site LF004
# Southern Area Remediation Wells



# Site LF004
# Southern Area Remediation Wells

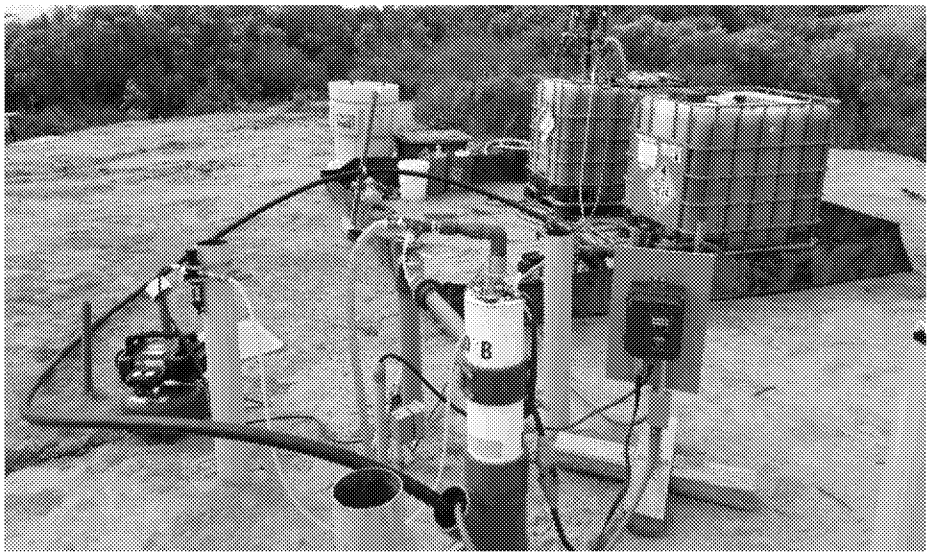
## Activity Summary

- Batch oxidant injections at LF01-W24 wells were conducted on 12 and 15 Sep 2014; trace levels of oxidant still observed at W24M. W24SM PCE concentrations (PDB samples) were reduced by approximately 50% (17 ppb May to 7 ppb Nov) Trace detections of oxidant observed in W41M in Nov 2014
- Oxidant injection began at recirculation well RW02B on 6 Jan 2015. Field screening for oxidant indicated the presence of oxidant in the shallow and medium probes near piezometer PZ02BA (~ 50 feet down gradient and south), and in the shallow probe of PZ02BB (~102 feet east and north of RW02B). The presence of oxidant in the middle probe of PZ01BA and the shallow probe of PZ02BB indicates both vertical and horizontal dispersion into the aquifer.

# Site LF004
# Southern Area Remediation Wells

## Activity Summary (cont)

- Additional oxidant injections planned for LFW19 in March
- Replace motor and reinstall pump at RW02C



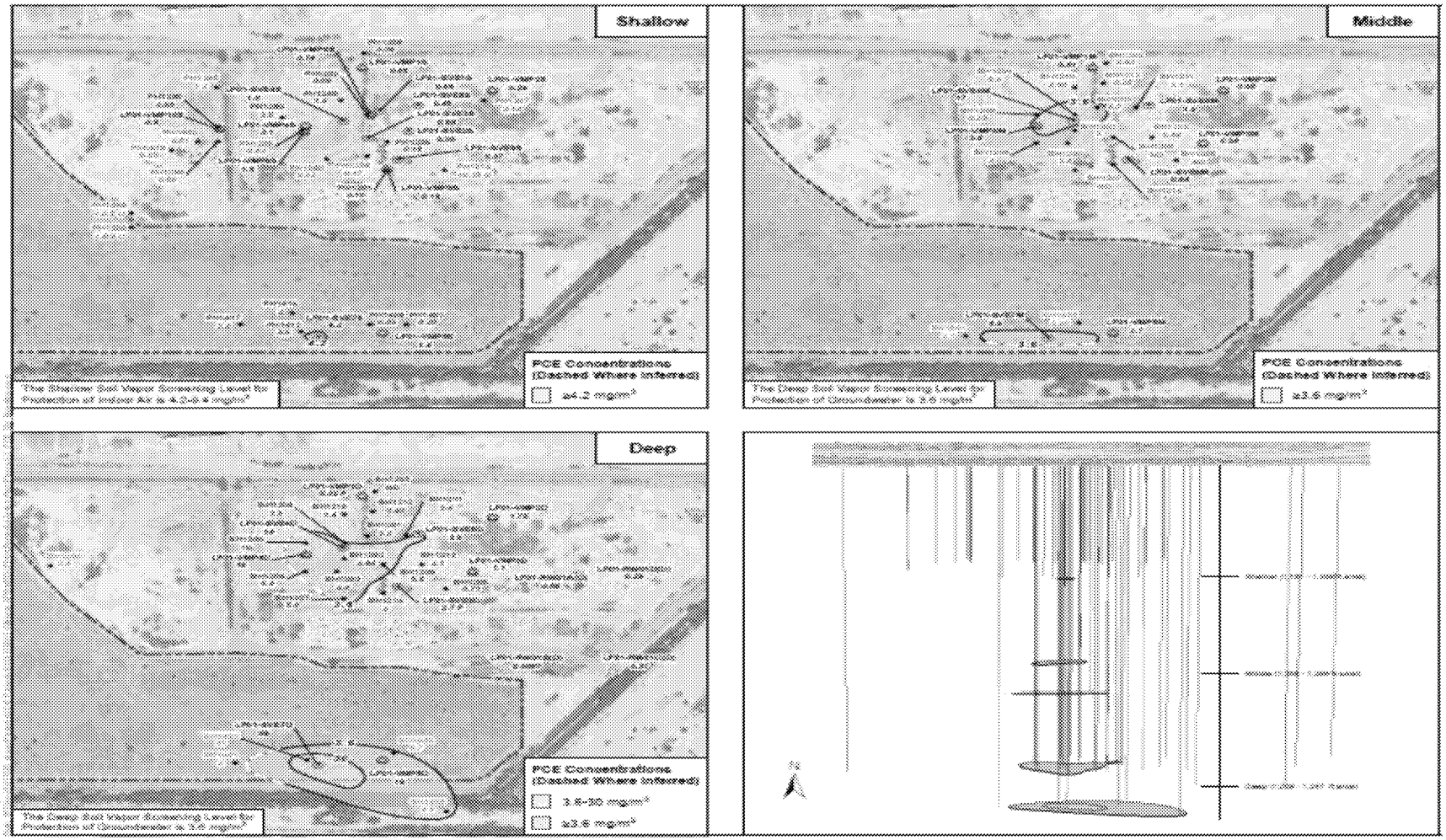
# Site LF004
# Southeast Landfill SVE System Update

## Operations Summary thru 8 Mar 2015

- Began operation 12 Sep 2014
- Approximate 99% operational uptime from startup
- Inlet PCE concentration has ranged from 6,900 $\mu g/m^3$ at startup to 49,000 $\mu g/m^3$ in Oct 2015; PCE and TCE concentrations were 12,000 and 3,900 $\mu g/m^3$ respectively, thru 8 Mar 2015
- Estimated 17.9 pounds of TCE and PCE removed
- Extraction from SVE7D currently; shallow and middle intervals have negligible levels of soil gas
- SVE component of RW02A (PCE concentration has ranged from 6,600 to 17,000 $\mu g/m^3$ ) since start up in Jan 2015

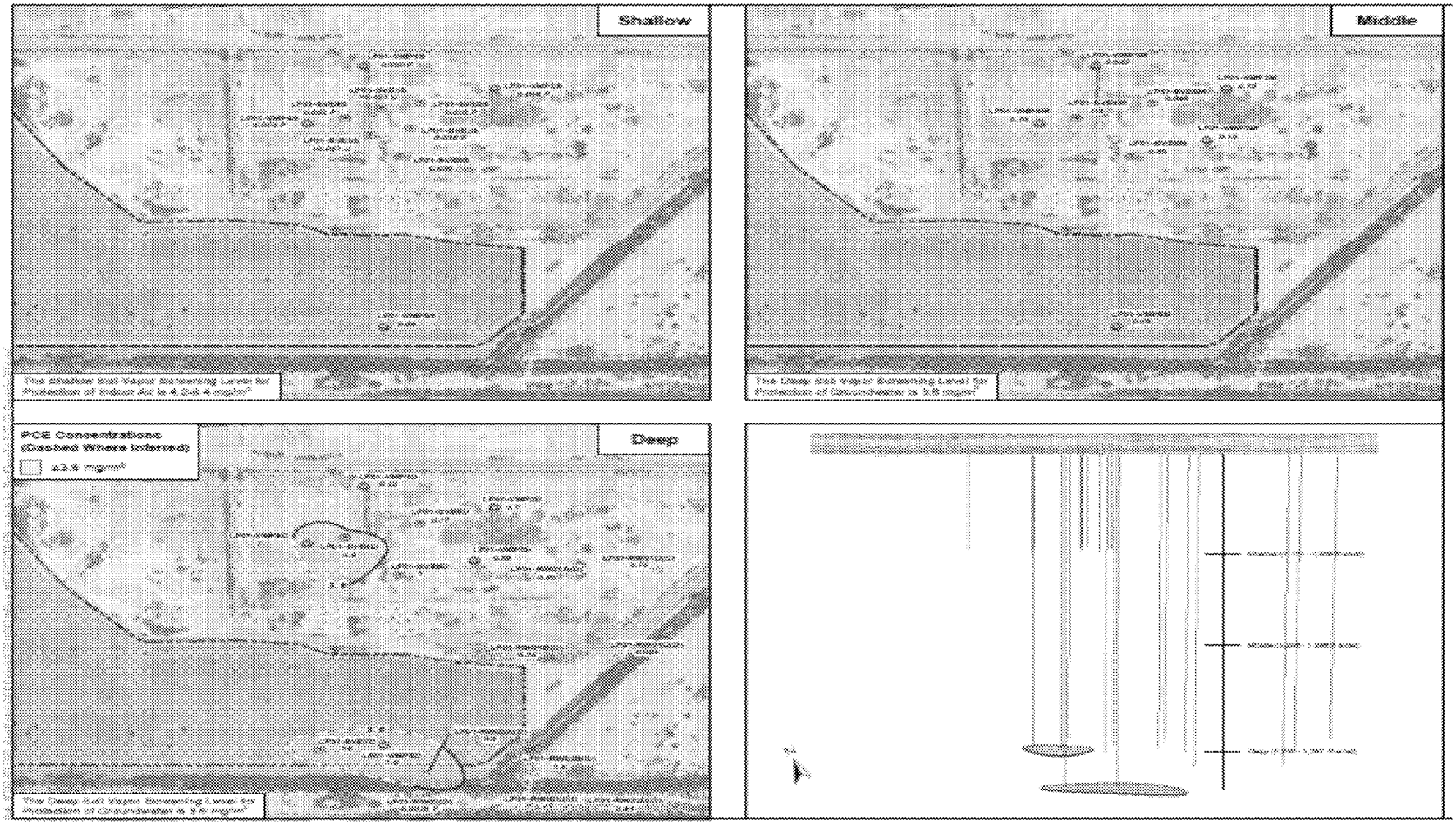
# Site LF004 PCE Soil Vapor September 2014

Prior to Treatment



# Site LF004 PCE Soil Vapor December 2014

After 3 Months of Operation



# Site LF004
# Remediation System Recent and Upcoming Activities

- Monthly oxidant injection groundwater monitoring event completed on 4-5 Feb 2015
- Quarterly remedial action groundwater monitoring event completed on 16-20 Feb 2015
- Quarterly soil vapor monitoring sampling event completed the week of 9 Feb 2015
- Continued operation of IWAS, SVE, and Southern Area remediation wells
- Oxidant injections at LF01-RW02B and LF01-RW01 will continue; oxidant injections planned to begin at LF01-RW01 in Mar 2015
- Connect VMP-2 to SVE in AST area in Mar 2015

# *Headquarters U.S. Air Force*

***Integrity - Service - Excellence***

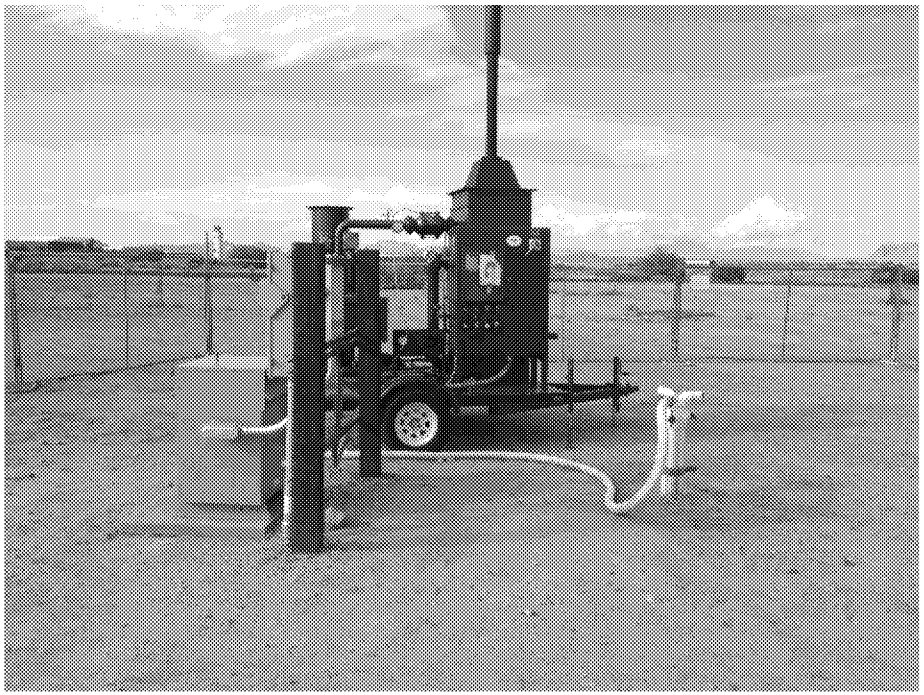
# Site FT002, Fire Training Area

# REMEDIAL ACTION

# Site FT002
# Soil Vapor Extraction System Update

**System Description**

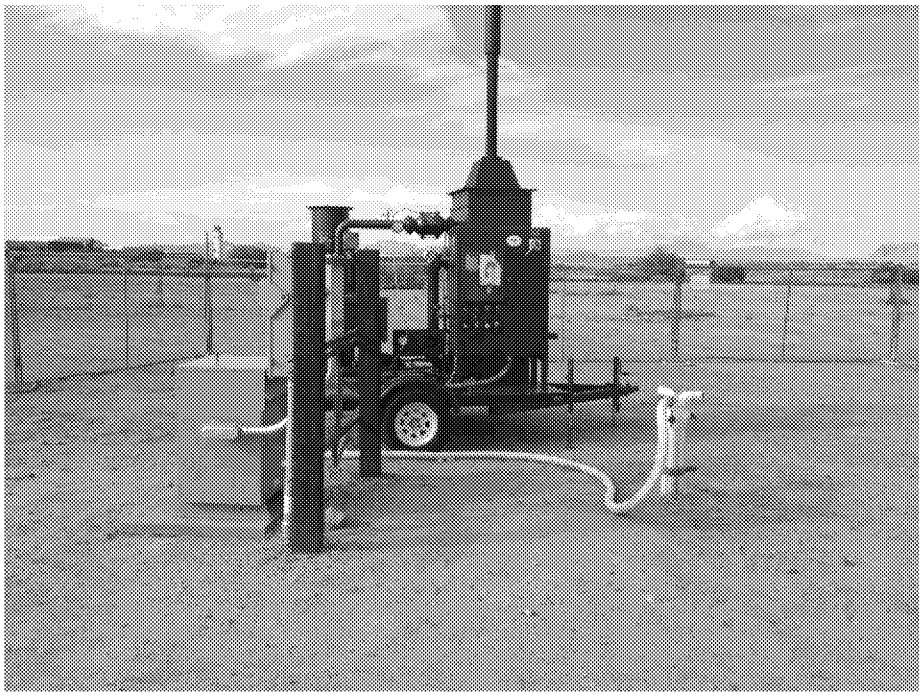
- One nested SVE well with three screen intervals - shallow (S) 14-39 ft, middle (M) 42-57 ft, and deep (D) 60-75 ft
- Treatment system: Combination thermal oxidizer (for concentrations exceeding 2000 ppmv) and electric catalytic oxidizer (for concentrations less than 2000 ppmv)



# Site FT002
# Soil Vapor Extraction System Update

## Jun-Nov 2014 Operation

- Operated from 2 Jun - 7 Jun 2014 initially on SVE-1D (deep interval) and then SVE-1M (middle interval) from 2 Jul 2014 – 25 Nov 2014
- Due to asymptotic COC concentrations for SVE-1M, switched to SVE-1S (shallow interval) on 25 Nov 2014



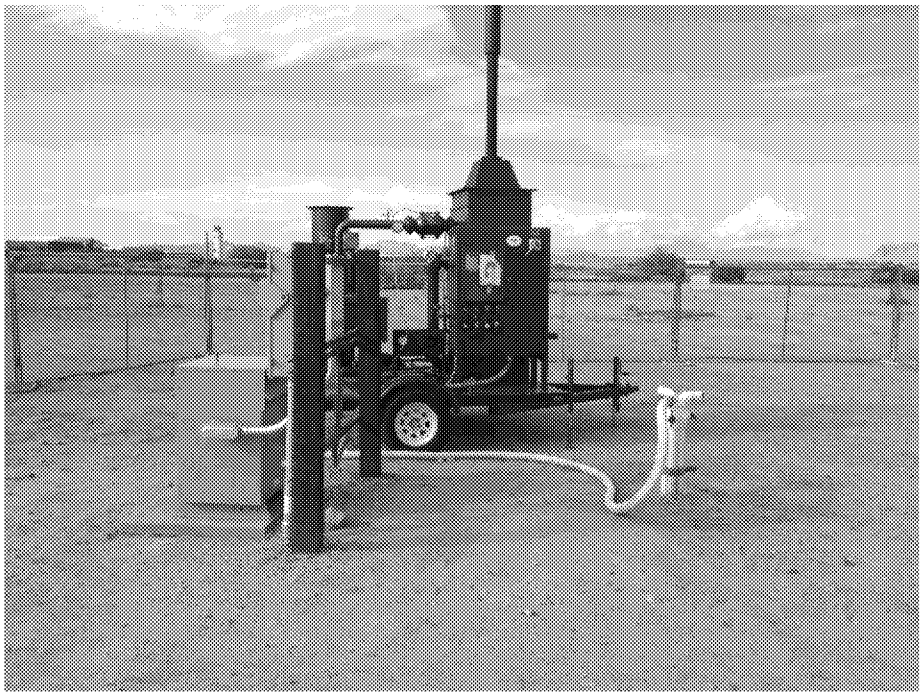
## Dec 2014-Feb 2015 Operation

- Due to decreasing PID readings for SVE-1S switched to SVE-1D for three week testing period, 12 Dec 2014 – 2 Jan 2015

# Site FT002
# Soil Vapor Extraction System Update

## Dec 2014-Feb 2015 Operation

- Based on preliminary 12 Dec 2014 analytical results from SVE-1S, switched back to SVE-1S on 9 Jan 2015
- Samples collected from system effluent, influent, and SVE-1S (TO-3 and TO-15 analysis) and VMP-1 and VMP-2 (TO-15) analysis on 30 Jan 2015
- Samples collected from SVE-1S, SVE-1M, and SVE-1D (TO-15 analysis) on 13 Feb 2015



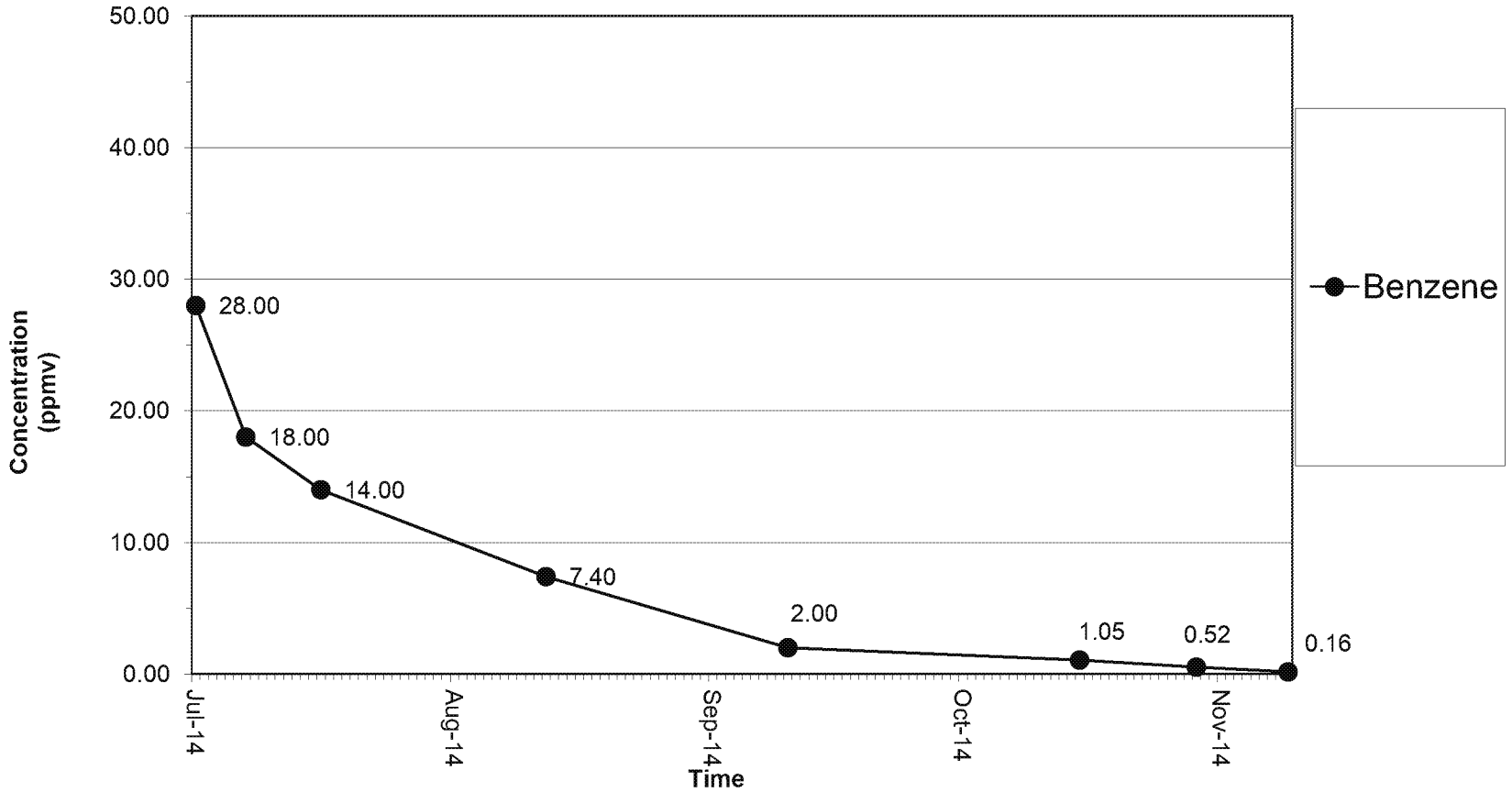
# Site FT002 – Estimated COC Mass Removal

| VOC | Estimated pre-SVE mass in soil as total pounds | Mass removed through 2/13/15 as total pounds (since last update) |
|---|---|---|
| Benzene | 40-45 | 33.6 |
| Toluene | 750 | 574 |
| Ethylbenzene | 300 | 160 |
| Xylene | 1700 | 763 |
| Total TMB | 800 | 107 |

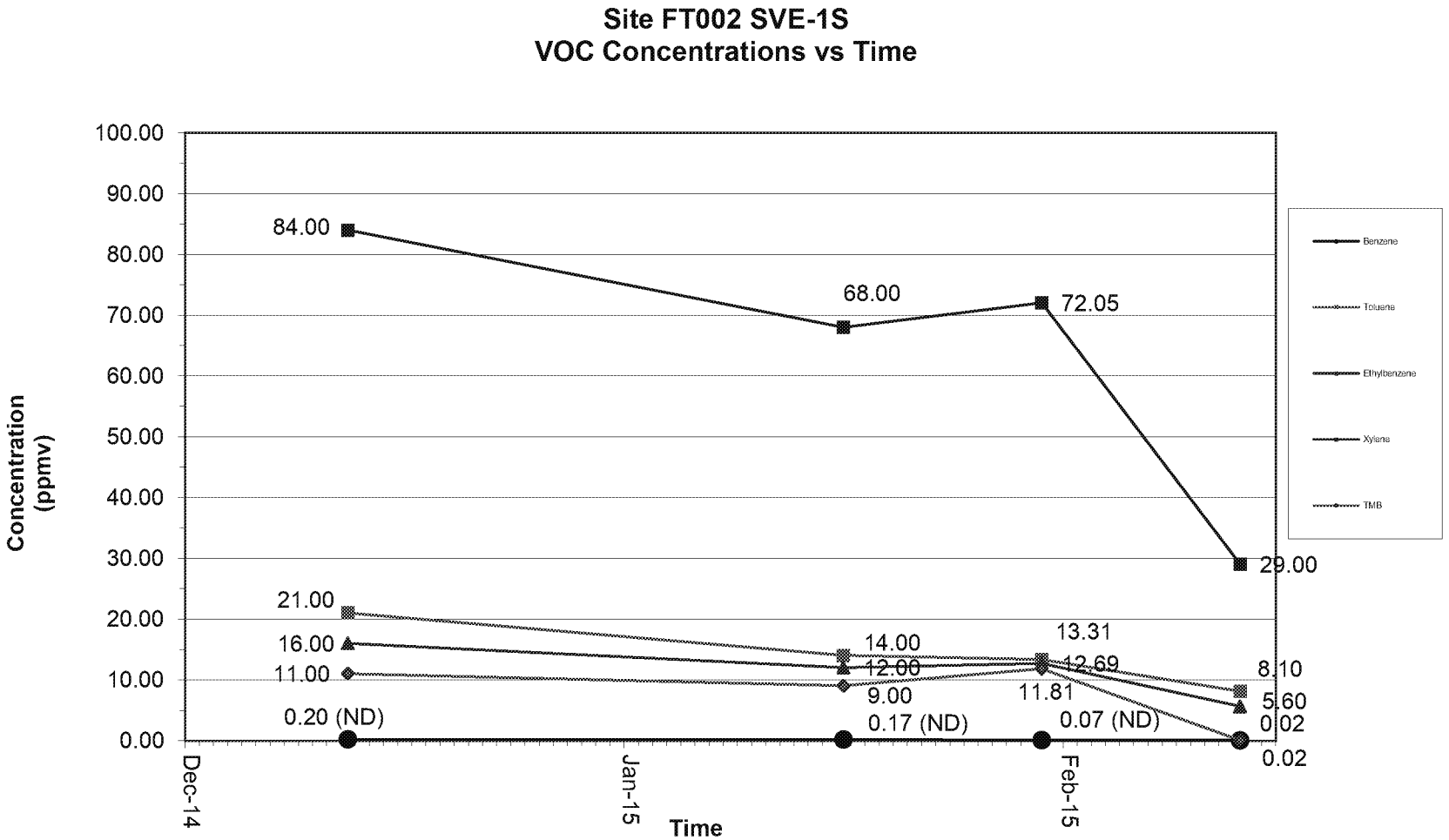
30’ x 30’ impacted area.
65’ contaminated thickness (10-75 feet bgs).
In-situ soil density of 100 lb/cf.
Average COC concentrations across vertical thickness from June 2013 data

# Site FT002 SVE System Performance – Benzene

**Figure 3-3**
**Site FT002 SVE-1M**
**Benzene Concentrations vs Time**



# Site FT002 SVE System Performance – COCs



# Site FT002 Path Forward

- Continue SVE operation through Mar until analytical results for Feb 2015 are received and reviewed. Based on results, SVE may continue or the system shut down and the rebound testing phase implemented.

- If contaminant concentrations at monitoring points remain above screening levels, then continue SVE operation.

- If contaminant concentrations at monitoring points are below their respective screening levels, proceed to rebound testing.

# Site SS017, Old Pesticide/Paint Shop

# Site SS017 Path Forward

- Final Supplemental Risk Assessment for Site SS017 - September 2014
- Air Force submitted 2014 Amended Proposed Plan with No Further Action as the preferred alternative at Site SS017 for regulatory agency review - September 2014
- Responses to regulatory agency comments and 2015 Draft Final Amended Proposed Plan submitted – January 2015
- Regulatory agencies disagree with No Further Action preferred alternative and invoked formal dispute resolution – 20 February 2015
- Dispute resolution will proceed in accordance with Federal Facility Agreement
  - Current Plan - Dispute Resolution Committee made up of senior Air Force and regulatory agency representatives will resolve or elevate by 13 April 2015

# Headquarters U.S. Air Force

***Integrity - Service - Excellence***

## PARCEL N UPDATE

# Headquarters U.S. Air Force

*Integrity - Service - Excellence*

## 2014 LOOK AHEAD

## DOCUMENTS

## MEETINGS/CONFERENCE CALLS

# Headquarters U.S. Air Force

***Integrity - Service - Excellence***

## BCT GENERAL UPDATE

# Headquarters U.S. Air Force

***Integrity - Service - Excellence***

## ACTION ITEMS